United States
Department of
Agriculture

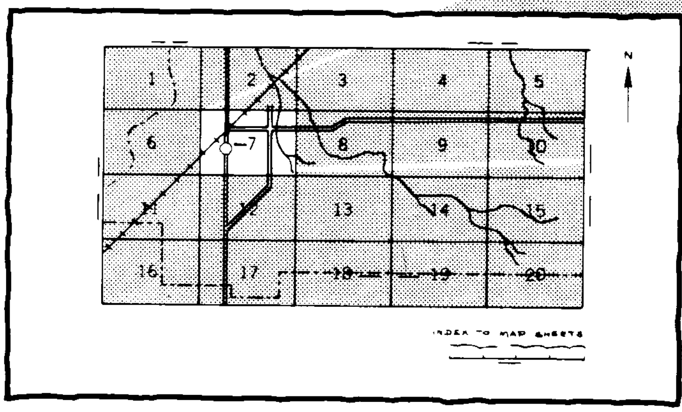
Soil
Conservation
Service

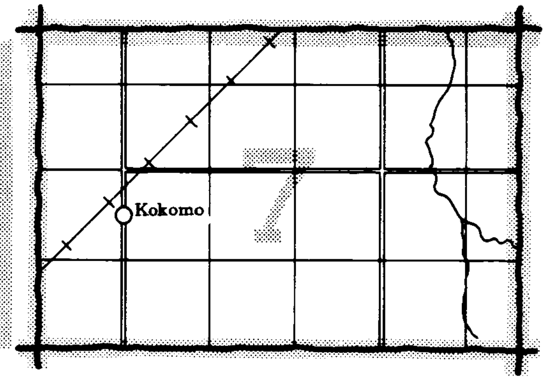
In Cooperation with
United States
Department of Agriculture
Forest Service
Department of the Interior
Bureau of Land
Management and
Bureau of Indian Affairs
University of Nevada
Agricultural
Experiment Station

Soil Survey of Douglas County Area Nevada

HOW TO US

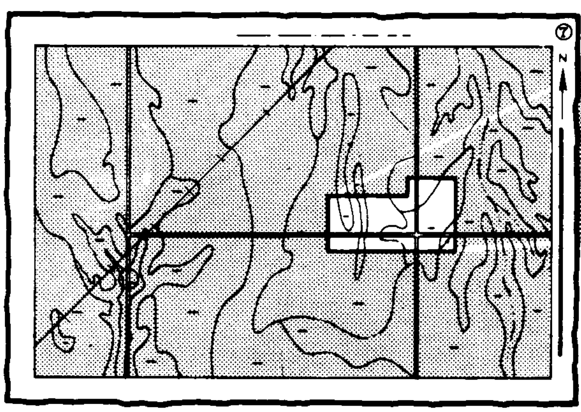
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

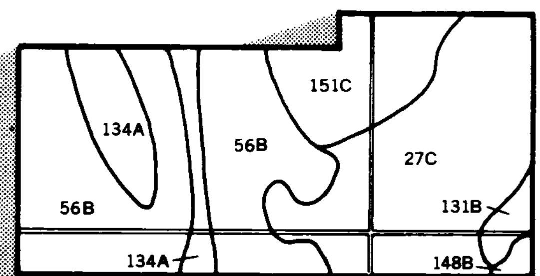




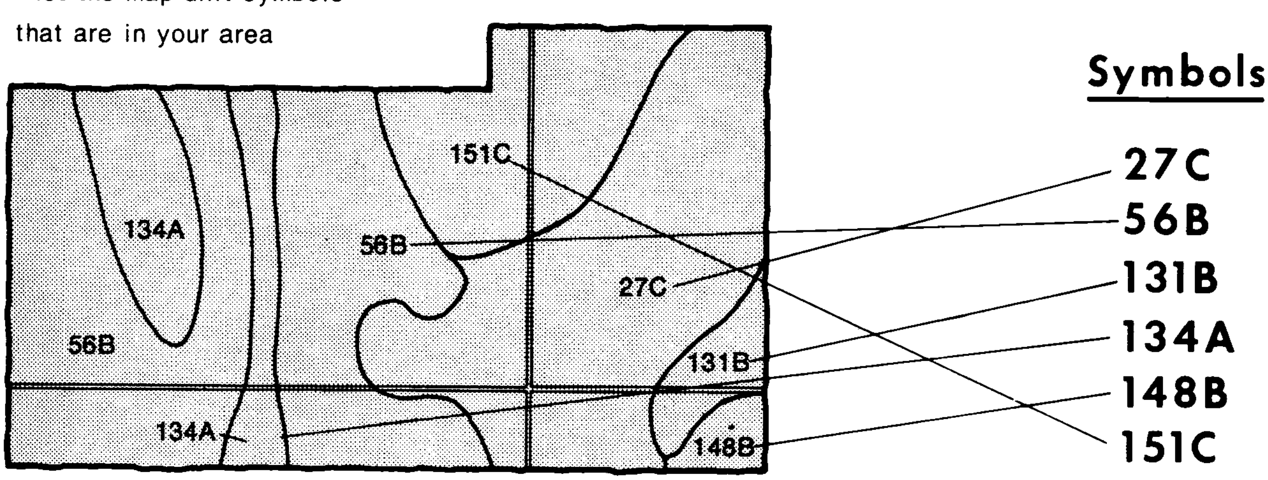
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



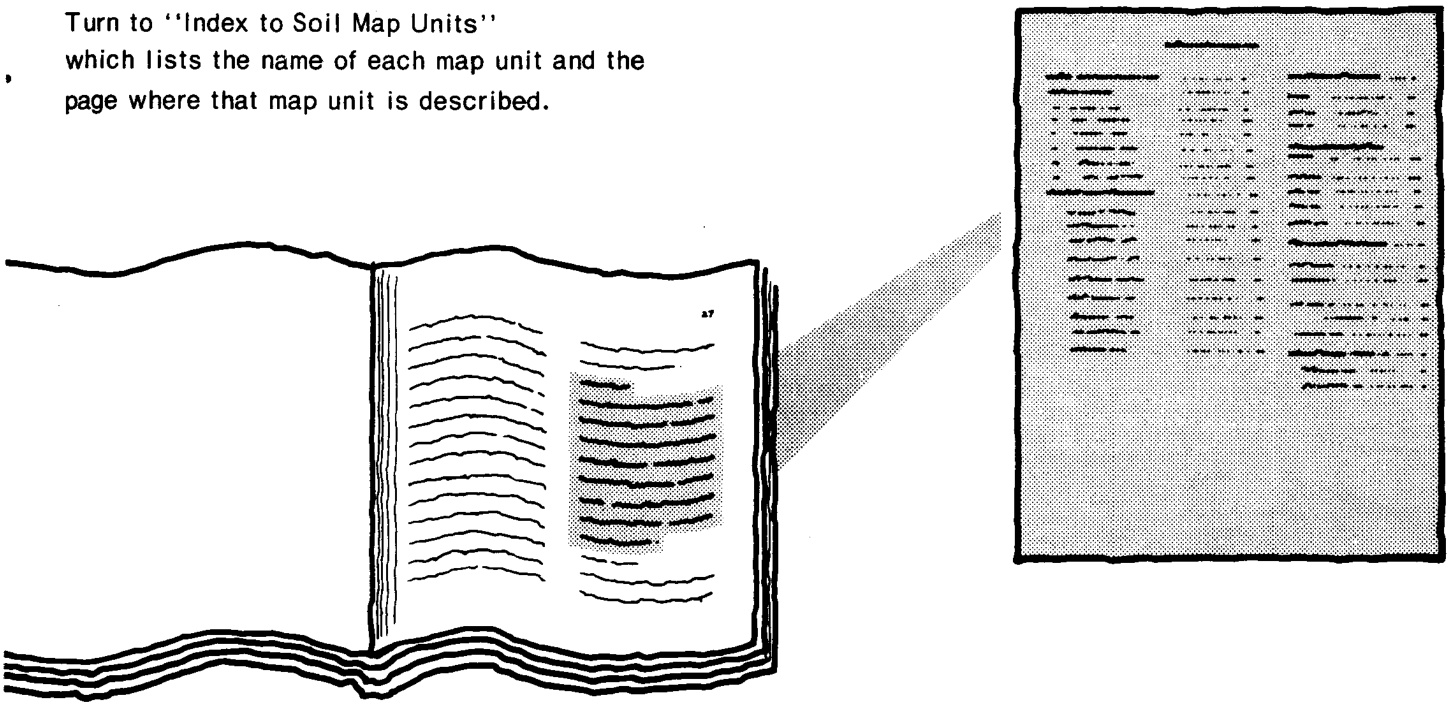


4. List the map unit symbols that are in your area

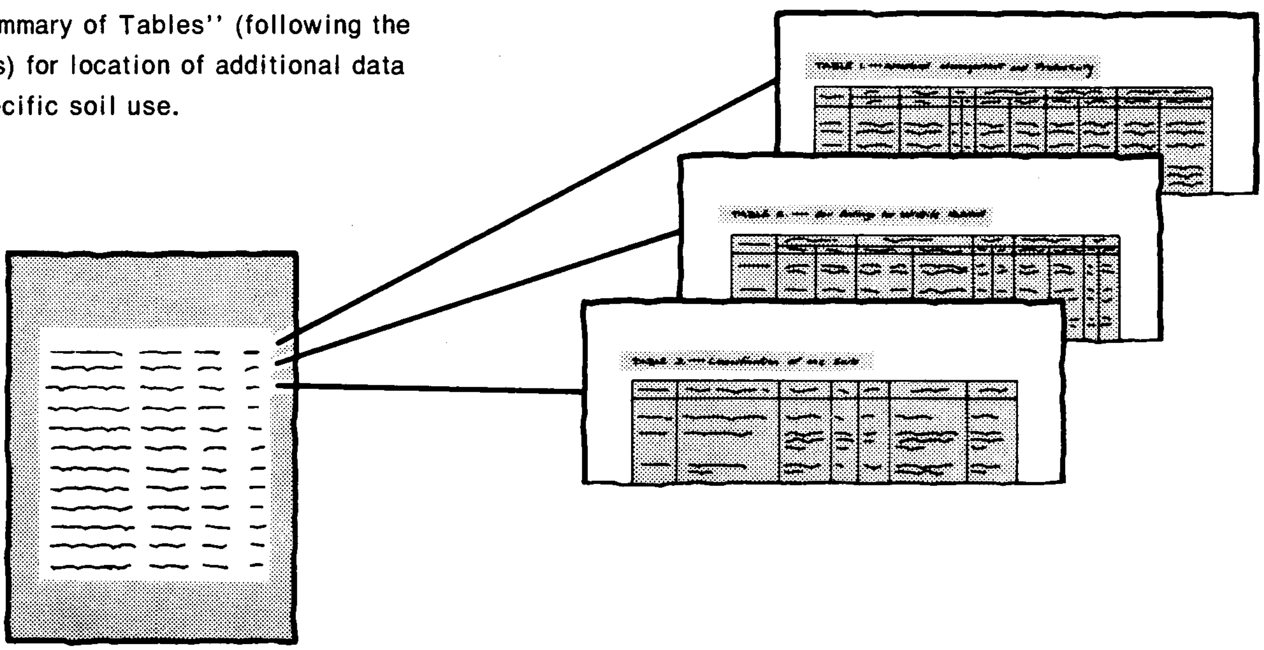


IS SOIL SURVEY

Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1975-1979. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the United States Department of Agriculture, Soil Conservation Service and Forest Service; the United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; and the University of Nevada Agricultural Experiment Station. It is part of the technical assistance furnished to the Carson Valley Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Farmland in Carson Valley near the towns of Minden and Gardnerville. The Cradlebaugh, Kimmerling, and Ophir soils are dominant. The Carson Range is in the background. The Toiyabe, Witefels, and Temo soils are dominant.

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Soil Series

Issued January 1984

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in the Douglas County Area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

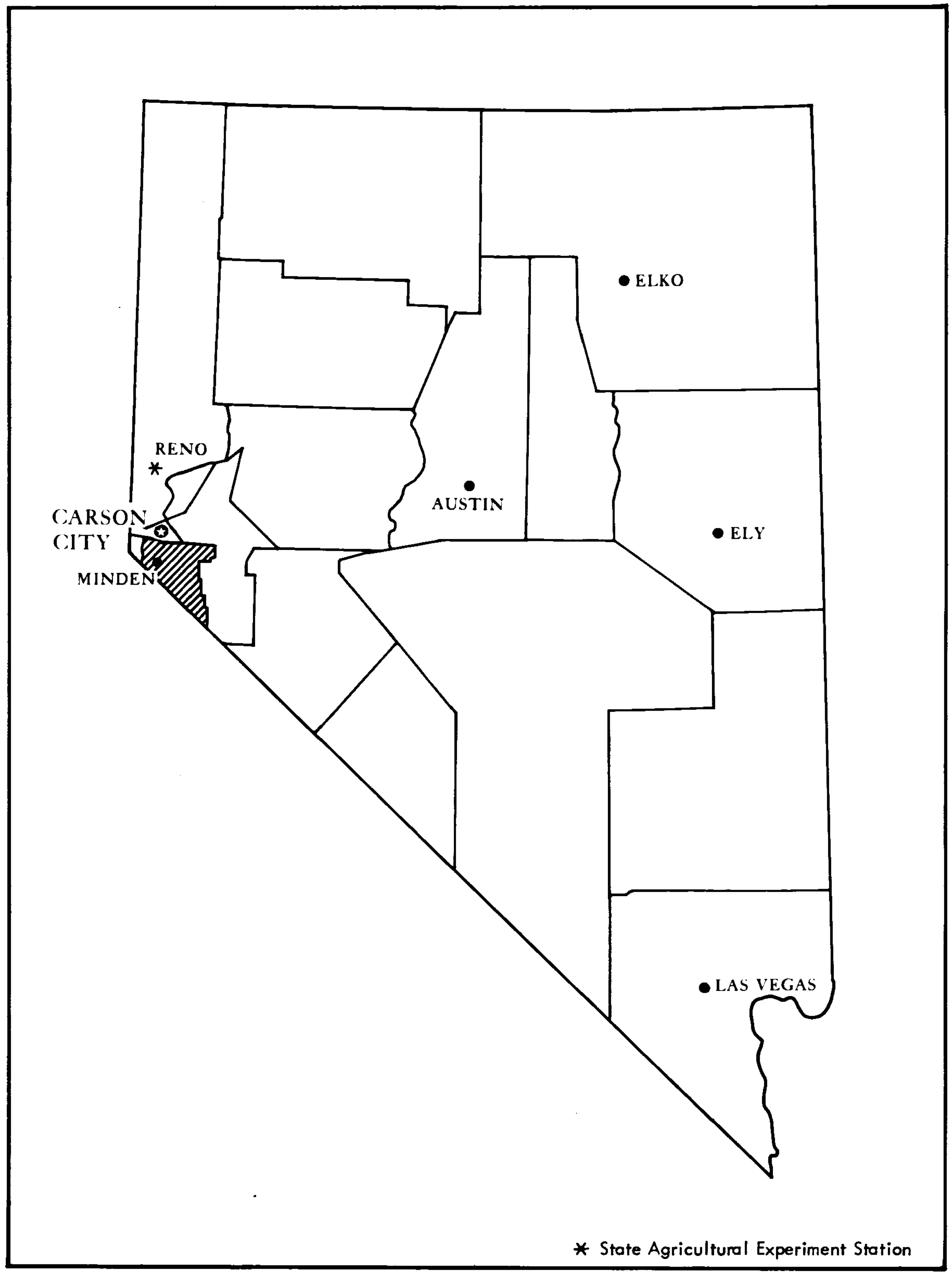
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Gerald Thola

Gerald C. Thola
State Conservationist
Soil Conservation Service



Location of Douglas County in Nevada

Soil Survey of Douglas County Area, Nevada

By David M. Candland, Soil Conservation Service

Fieldwork by David M. Candland and Paul W. Blackburn, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In Cooperation with
United States Department of Agriculture, Forest Service
United States Department of the Interior
Bureau of Land Management and Bureau of Indian Affairs
and the University of Nevada, Agricultural Experiment Station

DOUGLAS COUNTY AREA is in the west-central part of Nevada. It has an area of 435,199 acres or approximately 680 square miles. Minden and Gardnerville are the principal cities.

The survey area is bounded on the north by Carson City; on the northeast and east by Lyon County; on the south and southwest by Alpine County, California; and on the west by the crest of the Carson Range.

Approximately half of the survey area is privately and municipally owned. The rest is under the administration of the Bureau of Land Management, Bureau of Indian Affairs, and Forest Service.

Future population increases within the survey area are expected to affect the distribution of scarce resources. Among the changes expected are transfer of water from agricultural to residential or municipal uses and the conversion of high quality agricultural land to nonagricultural uses.

General Nature of the Survey Area

This section gives general information about the survey area. It briefly discusses history, farming and ranching, transportation, water supply, drainage, geology, and climate.

History

The Carson Valley was first explored in the fall of 1833. Captain Joseph R. Walker and a party of trappers crossed the area in seeking a route over the Sierra Nevada Mountains. The first settlers arrived during the gold rush of 1849. In 1851, the first settlement, Mormon Station, was established; in 1855 the name was changed to Genoa. Genoa became the first county seat and remained so until 1915.

The Comstock Lode was discovered in 1859 and a market for farm products was immediately created. The farms of the Carson Valley provided part of the food required in Virginia City during the boom years of 1860 to 1879.

From 1880 to the 1940's, Douglas County maintained a stable, quiet, agricultural character. After World War II the Carson Valley and Tahoe Basin became more accessible, and the population steadily increased.

Farming and Ranching

Farming began with the arrival of settlers and spread wherever water was available. Alfalfa was introduced about 1860. A few farms, chiefly in the northern part of the Carson Valley, were established by the early 1900's.

Most of the farms and ranches are operated by owners. An average farm is 250 acres, of which 200 acres are irrigated.

Approximately 45,000 acres of cropland and meadow is irrigated in the survey area. The number of irrigated acres changes little from year to year, even though the water supply varies. During years in which water is scarce, some land does not receive irrigation water at regular intervals.

Livestock is an important farm enterprise. The major business is beef cattle. A few farms throughout the

survey area have flocks of sheep. Some dairy operations are in the Carson Valley. Most ranches and farms provide grazing for the livestock, but some major livestock producers use private and public lands in nearby areas for grazing.

Transportation

U.S. Highway 395 passes through Douglas County from north to south. Local farm to market roads are paved and maintained. New developments in outlying areas are serviced by graded gravel or dirt roads.

The survey area is served by buslines and trucklines, but not by railroads or major airlines. Charter airplane or helicopter service is available at the Douglas County Airport, 3 miles north of Minden.

Water Supply

The Carson River is the major water source within the survey area. The two forks of the river originate in the eastern slopes of the Sierra Nevada Mountains with most of the watershed lying in Alpine County, California. The two forks meander through the valley and join east of Genoa. The Carson River recharges the ground water within the Carson Valley, and the result is a high water table in large portions of the valley floor.

All surface water rights on the Carson River are allocated. The majority of the water rights are for agricultural use.

Almost all domestic and municipal water supplies are provided from ground water sources. The demand for ground water has become so great that the use of ground water is designated. Permits for use of irrigation are needed, and the number of wells used for irrigation is controlled.

Drainage

The survey area is drained mainly by the Carson River and the West Walker River. The East Fork and West Fork of the Carson River drains Carson Valley. They enter the southwestern part of the survey area, join together east of Genoa, and exit from the northwestern part. West Walker River drains Antelope Valley. Buckeye and Pine Nut Creeks drain the area east of Minden and Gardnerville. Indian and Bryant Creeks drain the southern part of the survey area. Risue Canyon drains the southern part of the Wellington Hills area. Jackass Creek and Desert Creek tributaries drain the Sweetwater Mountains in the southeastern part of the survey area. The Churchill Canyon area and the Lincoln Flats are drained by Churchill Canyon. The rest of the survey area is drained by intermittent streams, mainly Red Canyon and Minnehaha Canyon, that flow only for short periods in spring or during localized storms in summer.

Geology

Granitic rock, predominantly nonporphyritic quartz monzonite, granodiorite, and hybrid mafic rock, underlies most of the soils of the mountains within the survey area (*8*). Small units of granitic porphyry and porphyritic quartz monzonite occur in the Pine Nut Mountains and Buckskin Range. Most of the deformation preceding and accompanying emplacement of the mountains occurred during the Cretaceous Epoch. The Carson Range, Pine Nut Mountains, and the Sweetwater Mountains are generally horstlike and are flanked by impressive faults that crest some 4,000 feet above the valley floor. Typically, the Temo, Witefels, Toiyabe, and Roloc soils derived from these rocks.

Metavolcanic rock of Triassic and Jurassic age underlies large areas of soils in the survey area. The areas are generally north and northwest of Genoa, in the southern part of the Pine Nut Mountains, and in the Buckskin Range. Andesitic breccias are the most abundant. Many of these volcanic rocks have metamorphosed relatively little. Metamorphosed basaltic rock and metarhyolitic rock are also present. Typically, the Koontz and Sutro soils derived from these rocks.

Andesite rock and related volcanic rock, including rhyolitic tuff, are mostly in the southern part of the Buckskin Range. Extrusion of these rocks occurred intermittently over a considerable span of the middle Tertiary period. These rocks are commonly interbedded with sedimentary bedrock of the same age. The Cagle, Duco, Nosrac, and Loomer soils formed from material weathered from andesite.

Metasedimentary rocks are largely derived from limestone and limy clastic. They occur mostly in the south-central part of the Pine Nut Mountains. They are of Late Triassic and Early Jurassic age. These rock formations have been warped and faulted. The Kram soil formed in material weathered from metasedimentary rock.

Tertiary sedimentary material (Tertiary mudstone) is in the central part of the survey area on high terraces. The sediments were deposited in isolated basins. They are generally Tertiary lake and stream deposits of tuffaceous shale, siltstone, sandstone, conglomerate, and in many places, deposits of stream or pediment gravel. Uplifts and subsequent dissection have produced terraces capped by gravel. Typically, the Verdico, Pulcan, Pula, Puett, and Uhaldi soils formed in material weathered from these sediments.

The oldest valley fill is mixed gravelly sediments of Tertiary and Quaternary ages. It makes up the terraces in Carson Valley, Pine Nut Valley, and Mineral Valley. After these sediments were deposited, they were later strongly faulted and tilted. The Indian Creek, Washoe, and Reno soils formed in alluvium derived from these sediments.

The youngest material in the survey area consists of recent alluvium in flood plains and alluvial fans. The sediment is mixed alluvium of the Quaternary Period. It is usually stratified clay, silt, and sand. Typically, the Voltaire, East Fork, and Haybourne soils formed in this material.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In Douglas County, summer is hot, especially at a lower elevation, and winter is cold. Precipitation is normally light at a lower elevation during all months of the year. At a higher elevation, precipitation is much heavier, and snow accumulates to a considerable depth.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Topaz Lake in the period 1957 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season as recorded at Minden during the period 1951 to 1973.

In winter the average temperature is 33 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Minden on January 4, 1971, is 20 degrees. In summer the average temperature is 66 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, 105 degrees, occurred on July 19, 1960.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 2 inches, or 25 percent, generally falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 2 inches. The heaviest 1-day rainfall during the period of record was 3.03 inches at Minden on January 31, 1963. Thunderstorms occur on about 13 days each year, and most occur in summer.

Average seasonal snowfall is 9 inches at Minden and 21.4 inches at Topaz Lake. The greatest snow depth at any one time during the period of record was 12 inches at Minden. On an average of 7 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 30 percent. Humidity is higher at night, and the average at dawn is about 60 percent. The sun shines 90 percent of the time possible in summer and 66 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 8 miles per hour, in April.

Every few years a blizzard strikes the survey area with high winds and considerable drifting snow. Even at a lower elevation, snow remains on the ground for many weeks, causing the livestock to suffer.

How This Survey Was Made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General Soil Map Units" and "Detailed Soil Map Units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The sixteen map units in this survey area have been grouped into four general kinds of landscapes for broad interpretive purposes. Each of the broad groups and the map units in each group are described in the following pages.

Areas Dominated by Soils on Flood Plains and Low Stream Terraces

Areas of these soils are dominantly on low terraces and flood plains of the Carson and West Walker Rivers. The average annual precipitation is 8 to 10 inches, the average annual temperature is 48 to 50 degrees F., and the frost-free period is 100 to 120 days.

These soils are nearly level to moderately sloping and very deep or moderately deep. They are fine textured to coarse textured throughout. Most of these soils are young and exhibit little if any profile development.

Most of the soils in this group have a seasonal high water table and are subject to flooding; however, some of the soils have altered drainage and are not subject to flooding. Saline-alkali concentrations are highly variable throughout areas of these soils.

1. Cradlebaugh-Voltaire

Nearly level, very deep, poorly drained soils; on flood plains

Areas of this map unit are mainly in the central and northern parts of Carson Valley on the lower elevations adjacent to the Carson River. The vegetation near the stream channels is mainly creeping wildrye and basin wildrye. The vegetation in higher positions on the flood plain is mainly black greasewood, inland saltgrass, and basin wildrye.

This unit makes up about 3 percent of the survey area. The most extensive soils in this unit are the Cradlebaugh and Voltaire soils.

The poorly drained Cradlebaugh soils are on flood plains near the channels. These soils are dominantly stratified medium and moderately fine textured throughout. They are subject to flooding. In some areas drainage has been altered by stream entrenchment or channel diversion structures. Small areas are strongly saline-alkali affected.

The poorly drained Voltaire soils are on flood plains in slightly higher positions. The upper part of these soils is fine textured, and the underlying material is stratified and moderately fine to coarse textured. Most areas of these soils are strongly saline-alkali affected. Most areas are subject to short periods of flooding.

Of minor extent in this unit are Job Variant and Voltaire Variant soils. These soils are calcareous throughout. The Job Variant soils are on low terraces, have medium texture, and contain high concentrations of gypsum. The Voltaire Varaint soils are on alluvial fans and dominantly have moderately fine and fine textures throughout. Vegetation is similar to that on the major soils.

The soils in this unit are used for irrigated hay and pasture, rangeland, and rangeland wildlife habitat.

The main limitations for irrigated hay and pasture are the flooding and high water table in the Cradlebaugh soils and the high water table, slow permeability, and slow infiltration in the Voltaire soils.

The main limitation for rangeland and rangeland wildlife habitat is the high water table. The high concentration of salt and sodium is also a limitation in the saline-alkali affected areas.

2. Kimmerling-Ophir-Jubilee

Nearly level to moderately sloping, very deep, poorly drained soils; on flood plains and alluvial fans

Areas of this map unit are mainly in the west side of Carson Valley, Jacks Valley, and along the flood plain of the West Walker River. They are on flood plains and

moderately sloping alluvial fans below adjacent terraces. The vegetation along the flooded areas is creeping wildrye, basin wildrye, and Nevada bluegrass. The vegetation in the nonflooded areas are plants that are common to irrigated hayland and pasture.

This unit makes up about 5 percent of the survey area. The most extensive soils in this unit are the Kimmerling, Ophir, and Jubilee soils.

The Kimmerling soils are nearly level and poorly drained on flood plains. These soils are medium textured or moderately fine textured throughout. They are subject to flooding. Some areas are slightly saline-alkali affected.

The Ophir soils are nearly level to moderately sloping and poorly drained on alluvial fans. These soils are stratified gravelly coarse textured and gravelly moderately coarse textured throughout. Some areas have been drained because of stream channel entrenchment.

The Jubilee soils are nearly level and poorly drained on flood plains. These soils are stratified moderately coarse textured and coarse textured throughout. Some areas have a fine textured surface layer that is slightly saline-alkali affected.

Of minor extent in this unit are James Canyon, Job, Niwot, Settlemeyer, and Shalcar family soils. All the soils except Shalcar family soils are somewhat poorly drained or poorly drained and moderately coarse textured to moderately fine textured. The Shalcar family soils are very poorly drained and have an organic surface layer over a coarse to moderately fine textured substratum. Vegetation is similar to that of the major soils.

The soils in this unit are used for irrigated hay and pasture and for wetland wildlife habitat.

The main limitations for hay and pasture are the high water table in the Jubilee and Kimmerling soils and the low available water capacity and high water table in the Ophir soils. These soils are not limited for wetland wildlife habitat.

3. Hussman-Dressler-Ormsby

Nearly level, very deep, somewhat poorly drained soils; on low terraces

Areas of this map unit are mainly north of Minden and Gardnerville. They are on low terraces adjacent to the flood plains. Vegetation common to this unit is reflected by the irrigation of areas.

This unit makes up about 3 percent of the survey area. The most extensive soils in this unit are the Hussman, Dressler, and Ormsby soils.

The Hussman soils are somewhat poorly drained. They are moderately fine textured and fine textured throughout. Some areas are slightly saline-alkali affected and subject to short periods of flooding.

The Dressler soils are somewhat poorly drained. The surface layer is moderately coarse textured, and the underlying material is stratified coarse to cobbly moderately coarse textured. Areas are subject to flooding.

The Ormsby soils are somewhat poorly drained. They are coarse textured throughout.

Of minor extent in this unit are Brockliss, East Fork, Heidtman, Henningsen, and Henningsen Variant soils. These soils are somewhat poorly drained. All the soils are on low terraces except the Brockliss and Heidtman soils that are on flood plains. The Brockliss soils are stony or very stony coarse textured, East Fork and Heidtman soils are medium and moderately fine textured, and Henningsen and Henningsen Variant soils are moderately coarse or coarse textured.

The soils in this unit are used for irrigated hay, small grains, and pasture and for openland wildlife habitat. Some small areas are used for urban development.

The main limitation for cropland and openland wildlife habitat is the seasonal high water table. The Dressler and Ormsby soils are also limited by low available water capacity. The main limitation for urban development is the seasonal high water table. The Dressler soils are also limited by flooding.

4. Gardnerville-Dangberg-Fettic

Nearly level, very deep or moderately deep, somewhat poorly drained and poorly drained soils; on low terraces

Areas of this map unit are mainly in the central part of Carson Valley and Walker River areas. They are on low terraces adjacent to alluvial fans, high terraces, and foothills. The vegetation is mainly basin big sagebrush, black greasewood, creeping wildrye, and basin wildrye. Vegetation on soils that are saline-alkali affected is black greasewood, alkali sacaton, basin wildrye, and inland saltgrass.

This unit makes up about 2 percent of the survey area. The most extensive soils in this unit are the Gardnerville, Dangberg, and Fettic soils.

The Gardnerville soils are very deep and somewhat poorly drained. These soils are moderately fine textured and fine textured in the surface layer and fine textured and saline-alkali affected in the subsoil. Underlying the subsoil is weakly silica-cemented, stratified coarse textured material. Some areas are slightly saline-alkali affected in the surface layer.

The Dangberg soils are moderately deep and poorly drained. These soils are moderately fine textured to fine textured in the surface layer and fine textured, saline-alkali affected in the subsoil. Underlying the subsoil is a hardpan. Areas are subject to flooding.

The Fettic soils are very deep and somewhat poorly drained. These soils are medium textured or fine textured and saline-alkali affected in the surface layer. They are moderately fine textured in the subsoil and medium textured to coarse textured in the substratum. Areas are subject to flooding.

Of minor extent in this unit are Godecke, Updike, and Updike Variant soils. The Godecke soils are very deep and somewhat poorly drained. The Updike and Updike Variant soils are very deep and well drained. The vegetation is similar to that on the major soils.

The soils in this unit are used mainly for rangeland and rangeland wildlife habitat. Some areas of Dangberg soils that have irrigation water available and adequate surface drainage outlets are used for irrigated hayland. Some areas are used for urban development.

The main limitations for rangeland and rangeland wildlife habitat are the sodium affected subsoil and low precipitation. The limitations for urban development are a seasonal high water table and the flooding on the Dangberg and Fettic soils. Cropland on the Dangberg soils is limited by the seasonal high water table and slow permeability.

Areas Dominated by Well Drained Soils on Alluvial Fans and Terraces

Areas of these soils are mainly on alluvial fans and terraces between the flood plains and foothills. Elevation is 4,800 to 6,500 feet. The average annual precipitation is 8 to 12 inches, the average annual temperature is 48 to 51 degrees F., and the frost-free period is 100 to 120 days.

These soils mainly are well drained, but in areas that border mountain fronts, some of the soils have coarse texture and are excessively drained or somewhat excessively drained. These soils are nearly level to steep. They dominantly are very deep, but some are shallow to moderately deep over a hardpan. The soils range from coarse textured to fine textured, and some have silica cementation.

5. Haybourne-Turria-Springmeyer

Nearly level to steep, very deep, well drained soils; on alluvial fans

Areas of this map unit are on alluvial fans in the east-central part of Carson Valley and north and east of Topaz Lake. They are on alluvial fans between the flood plains and adjacent to foothills and mountains. The vegetation is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and bottlebrush squirreltail. In areas near shallow drains, the vegetation is mainly fourwing saltbush and basin wildrye or winterfat.

This unit makes up about 6 percent of the survey area. The most extensive soils in this unit are the Haybourne, Turria, and Springmeyer soils.

The Haybourne soils are nearly level to gently sloping. These soils are moderately coarse textured in the upper part of the profile and stratified moderately coarse and coarse textured in the lower part. Areas are subject to possible flooding under abnormal conditions.

The Turria soils are nearly level. These soils are medium textured or moderately fine textured in the surface layer, moderately fine textured in the subsoil, and stratified moderately coarse textured and medium textured in the substratum.

The Springmeyer soils are gently sloping to steep. These soils are stony or very stony medium textured to moderately coarse textured in the surface layer, moderately fine textured in the subsoil, and stratified coarse to moderately fine textured in the substratum.

Of minor extent in this unit are the Saralegui soils. These soils are moderately coarse textured throughout. Vegetation is Wyoming big sagebrush and Thurber needlegrass.

The soils in this unit are used mainly for rangeland and rangeland wildlife habitat. Some areas of Turria soils are used for irrigated cropland and for urban development.

The main limitation for rangeland and rangeland wildlife habitat is the low average annual precipitation. The main limitation for irrigated cropland is the seasonal availability of water. The main limitations for urban development on the Springmeyer and Turria soils are slow permeability and in some areas, steepness of slope. The Haybourne soils are limited by possible flooding under abnormal conditions and moderately rapid permeability.

6. Mottsville-Toll-Holbrook

Nearly level to steep, very deep, excessively drained, somewhat excessively drained, and well drained soils; on alluvial fans

Areas of this map unit are on alluvial fans in the western part of Carson Valley near the Hot Springs Mountains. They are on alluvial fans bordering the mountain fronts. The vegetation near the mountain fronts is mainly mountain big sagebrush, antelope bitterbrush, needleandthread, and Indian ricegrass. The vegetation on the lower part of the alluvial fans is Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and basin wildrye.

This unit makes up about 3.5 percent of the survey area. The most extensive soils in this unit are the Mottsville, Toll, and Holbrook soils.

The Mottsville soils are gently sloping to steep and excessively drained. These soils are coarse textured throughout. Some areas are subject to possible flooding under abnormal conditions.

The Toll soils are nearly level to strongly sloping and somewhat excessively drained. These soils are moderately coarse textured and coarse textured throughout.

The Holbrook soils are gently sloping to strongly sloping and well drained. These soils are gravelly or cobbly coarse textured to moderately coarse textured in the surface layer and are stratified extremely gravelly to extremely stony coarse texture to medium texture in the

underlying material. Areas are subject to possible flooding under abnormal conditions.

Of minor extent in this unit are Incy soils on sand dunes. These soils are coarse textured throughout. Vegetation is similar to that of the major soils.

The soils in this unit are used for rangeland, rangeland wildlife habitat, and urban development.

For urban development, flooding is a limitation on the Mottsville and Holbrook soils, and the moderately rapid or rapid permeability is a limitation on all the soils. In some areas, steepness of slope is a limitation.

7. Indian Creek-Phing-Reno

Nearly level to moderately steep, shallow, moderately deep, and very deep, well drained soils; on alluvial fans and terraces

Areas of this unit are mainly west of the Pine Nut Mountains. Some areas are on the alluvial fans bordering the Buckskin Range west of the Wellington Hills. The alluvial fans and terraces have been dissected or shaped by faulting, and have exposed, eroded side slopes. The vegetation is mainly low sagebrush, bottlebrush squirreltail, Sandberg bluegrass, and Thurber needlegrass.

This unit makes up 23 percent of the survey area. The most extensive soils in this unit are the Indian Creek, Phing, and Reno soils.

The shallow Indian Creek soils are nearly level to strongly sloping on alluvial fans and terraces. These soils are gravelly to very stony medium textured in the surface layer and fine textured in the subsoil. They are underlain by an indurated hardpan.

The very deep Phing soils are nearly level to moderately steep on alluvial fans and terraces. The surface is gravelly or very gravelly. These soils are medium textured or moderately coarse textured in the surface layer, fine textured in the subsoil, and medium textured to fine textured in the substratum.

The moderately deep Reno soil is nearly level to strongly sloping on terraces. The surface is gravelly to stony. These soils are moderately coarse textured to moderately fine textured in the surface layer and are fine textured in the subsoil. They are underlain by an indurated hardpan.

Of minor extent in this unit are Cassiro, Chalco, Greenbrae, Nevador, Perazzo, Prey, Pung, Rawe, Risue, Veta, Stucky, Springmeyer, and Washoe soils.

The soils in this unit are used for rangeland and rangeland wildlife habitat. Some small areas are used for urban development.

The limitations for rangeland and rangeland wildlife habitat are low precipitation, depth to the hardpan in Indian Creek and Reno soils, and the claypan in Phing soils. The main limitations for urban development are the cemented hardpan in the Indian Creek and Reno soils and the fine textured subsoil in the Phing soil.

Areas Dominated by Well Drained Soils on Foothills and High Terraces

Areas of these soils are on low foothills and high terraces. Elevation is 4,700 to 6,500 feet. The average annual precipitation is 8 to 12 inches, the average annual temperature is 48 to 51 degrees F., and the frost-free period is 100 to 120 days.

These soils are well drained and shallow to very deep. They are moderately sloping to steep on tops and side slopes of terraces and foothills. Most of the soils in this group have a well developed subsoil and are underlain by bedrock. In some areas, the shallow soils exhibit little profile development.

8. Pulcan-Puett-Chalco

Strongly sloping to steep, moderately deep and shallow, well drained soils; on high terraces and foothills

Areas of this map unit are on the high terraces and foothills west of the Wellington Hills. They are between mountains to the east and alluvial fans and terraces to the west. The vegetation on soils with a clayey subsoil is mainly low sagebrush, Thurber needlegrass, and pine bluegrass. On soils that are loamy and shallow it is mainly Wyoming big sagebrush, antelope bitterbrush, and desert needlegrass. Pinyon pine and Utah juniper have invaded some parts of this unit.

This unit makes up about 3 percent of the survey area. The most extensive soils in this unit are Pulcan, Puett, and Chalco soils.

The moderately deep Pulcan soils are moderately steep on high terraces. The surface is very gravelly. These soils are moderately coarse textured in the surface layer and very gravelly fine textured in the subsoil. They are underlain by soft bedrock.

The shallow Puett soils are moderately steep and steep on low foothills. These soils are moderately coarse textured and medium textured throughout. They are underlain by soft bedrock.

The shallow Chalco soils are strongly sloping and steep on high terraces. These soils are medium textured in the surface layer and fine textured in the subsoil. They are underlain by soft bedrock.

Of minor extent in this unit are Indian Creek soils on alluvial fans, Uhaldi soils on side slopes, and Haybourne soils in shallow drainageways. The Indian Creek soils are shallow, the Uhaldi soils are moderately deep, and the Haybourne soils are very deep. The vegetation is low sagebrush on Indian Creek soils. Big sagebrush is on Uhaldi and Haybourne soils.

The soils in this unit are used for noncommercial woodland, rangeland, and rangeland wildlife habitat.

The main limitation for noncommercial woodland is steepness of slope. The main limitations for rangeland and rangeland wildlife habitat are steepness of slope,

the claypan in the Pulcan soils, and the shallow depth to soft bedrock in the Puett soils.

9. Uhaldi-Pula-Nosrac

Strongly sloping to steep, moderately deep and very deep, well drained soils; on foothills and high terraces

Areas of this map unit are west of the Pine Nut Mountains and Wellington Hills. They are on foothills and high terraces adjacent to mountain slopes. The vegetation is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. Pinyon pine and Utah juniper have invaded many areas.

This unit makes up about 7 percent of the survey area. The most extensive soils in this unit are the Uhaldi, Pula, and Nosrac soils.

The moderately deep Uhaldi soils are moderately steep and steep on low foothills and high terraces. The surface is stony to very stony. These soils are medium textured in the surface layer and gravelly moderately fine textured in the subsoil. They are underlain by soft bedrock.

The very deep Pula soils are moderately steep and steep on high terraces. The surface is very gravelly or very stony. These soils are medium textured in the surface layer, very gravelly fine textured in the subsoil, and extremely gravelly moderately coarse textured in the substratum.

The very deep Nosrac soils are strongly sloping to steep on low foothills. The surface is stony or very stony. These soils are moderately coarse textured to moderately fine textured in the surface layer and very gravelly moderately fine textured or medium textured in the subsoil.

Of minor extent in this unit are Phing, Puett, and Chalco soils on side slopes of terraces and low hills. Vegetation is mainly Wyoming big sagebrush on the Puett and Chalco soils, or low sagebrush with antelope bitterbrush. It is Thurber needlegrass on the Phing soils.

The soils in this unit are used for rangeland and rangeland wildlife habitat.

The main limitations for rangeland and rangeland wildlife habitat are moderately low precipitation, steepness of slope, and invasion of pinyon pine and Utah juniper.

10. Stodick-Indiano-Loomer

Moderately sloping to steep, shallow and moderately deep, well drained soils; on foothills

Most areas of this map unit are on the foothills of the Pine Nut Mountains, Hot Springs Mountains, Wild Oat Mountains, Gray Hills, and Buckskin Range. The vegetation on the shallow soils is mainly low sagebrush and Thurber needlegrass. On the moderately deep soils, it is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass.

This unit makes up about 8 percent of the survey area. The most extensive soils in the unit are the Stodick, Indiano, and Loomer soils.

The shallow Stodick soils are moderately sloping to steep. The surface is stony or very stony. These soils are moderately coarse textured in the surface layer and very gravelly moderately fine textured in the subsoil. They are underlain by soft bedrock.

The moderately deep Indiano soils are steep. The surface is stony. These soils are moderately coarse textured in the surface layer and moderately fine textured in the subsoil. They are underlain by bedrock.

The shallow Loomer soils are moderately steep and steep. The surface is very cobbly or extremely cobbly. These soils are medium textured in the surface layer and very gravelly fine textured in the subsoil. They are underlain by bedrock.

Of minor extent in this unit are Theon, Olac, Borda, Aldax, and Zephan soils. These soils are on foothills.

The soils in this unit are mainly used for rangeland and rangeland wildlife habitat.

The main limitations for rangeland and rangeland wildlife habitat are moderately low precipitation, steepness of slope, and the shallow depth of the Loomer and Stodick soils.

Areas Dominated by Well Drained Soils on Mountains and Uplands

Areas of these soils are on the eastern slopes of the Carson Range. The soils are moderately steep to very steep. Elevation is 6,000 to 9,500 feet. The average annual precipitation is 15 to 50 inches, the average annual temperature is 36 to 45 degrees F., and the frost-free period is 30 to 80 days.

Areas of these soils are also on the sides of the Pine Nut Mountains, the Wellington Hills, and the mountains northwest of Topaz Lake. The soils are moderately sloping to very steep. Elevation is about 5,500 to 9,000 feet. The average annual precipitation is 12 to 20 inches, the average annual temperature is 41 to 50 degrees F., and the frost-free period is 60 to 120 days.

Most areas of these soils are well drained. They are shallow to very deep over bedrock. Some areas of the very deep soils have little profile development; in the rest of the areas, profile development is variable.

11. Cagle-Duco-Nosrac

Strongly sloping to steep, shallow, moderately deep, and very deep, well drained soils; on uplands

Areas of this map unit are in the eastern part of the survey area. They are on uplands between the foothills and mountains. The vegetation on the shallow and moderately deep soils is mainly singleleaf pinyon pine with some Utah juniper and an understory of Wyoming big sagebrush. Vegetation on the deep soils is mainly

mountain big sagebrush, antelope bitterbrush, and mountain brome.

This unit makes up about 17 percent of the survey area. The most extensive soils in this unit are the Cagle, Duco, and Nosrac soils.

The moderately deep Cagle soils are moderately steep and steep. They are on mainly south- and west-facing side slopes. The surface is very stony or extremely stony. These soils have a medium textured surface layer and a fine textured subsoil. They are underlain by bedrock.

The shallow Duco soils are strongly sloping to steep. They are on ridges and south-facing side slopes. The surface is stony to extremely stony. These soils have a medium textured surface layer and a very gravelly moderately fine textured subsoil. They are underlain by bedrock.

The very deep Nosrac soils are strongly sloping to steep. They are on north-facing side slopes. The surface is stony or very stony. These soils have a moderately coarse to moderately fine textured surface layer and a very gravelly medium textured and moderately fine textured subsoil.

Of minor extent in this unit are the Devada, Hyloc, Koontz, Kram, and Sutro soils on moderately steep and steep slopes. Of minor extent in an area northwest of Topaz Lake and south of Wellington Hills are the Burnborough, Glean, and Sup soils. These Burnborough, Glean, and Sup soils are on moderately steep to very steep mountain slopes and have slightly cooler temperatures than other minor soils in this unit.

The soils in this unit are used for noncommercial woodland, rangeland, and rangeland wildlife habitat.

The main limitations for woodland, rangeland, and rangeland wildlife habitat are the moderately steep to very steep slopes. The Duco soils are limited by the shallow depth to bedrock. Surface stones may hinder access to the cutting of trees in some areas.

12. Trid-Drit-Roloc

Moderately sloping to very steep, shallow, moderately deep, and very deep, well drained soils; on uplands

Areas of this map unit are on uplands, mainly the eastern face of Pine Nut Mountains. The vegetation is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and mountain brome. Pinyon pine and Utah juniper have invaded many areas.

This unit makes up about 10 percent of the survey area. The most extensive soils in this unit are the Trid, Duoc, and Roloc soils.

The Trid soils are moderately sloping to steep and moderately deep. They are on south- and west-facing side slopes. These soils have a coarse textured and moderately coarse textured surface layer and a very gravelly moderately fine textured subsoil. They are underlain by soft bedrock.

The Drit soils are moderately steep to very steep and very deep. They are on north-facing slopes. These soils are gravelly medium textured throughout.

The Roloc soils are moderately steep to very steep and shallow. They are on ridges and south-facing slopes. The surface is gravelly to extremely stony. These soils are very gravelly moderately coarse textured throughout. They are underlain by soft bedrock.

Of minor extent in this unit are the Minneha and Surgem soils and Rock outcrop. The Minneha soils are shallow over bedrock and are very gravelly medium textured. The Surgem soils are moderately deep over bedrock on east-facing slopes.

The soils in this unit are used for rangeland and rangeland wildlife habitat.

The main limitations for rangeland and rangeland wildlife habitat are the steepness of slope and the shallow depth to bedrock of the Roloc soils.

13. Glean-Genoa-Sup

Moderately sloping to very steep, shallow, deep, and very deep, well drained soils; on mountains

Areas of this map unit are on uplands of the Pine Nut Mountains and Wellington Hills. The vegetation on the deep soils is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and basin wildrye; on the shallow soils it is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass; and on the very deep soils it is mainly curlleaf mountainmahogany, mountain big sagebrush, pine bluegrass, and basin wildrye.

This unit makes up about 3 percent of the survey area. The most extensive soils in this unit are the Glean, Genoa, and Sup soils.

The Glean soils are moderately sloping to very steep and deep and very deep. These soils are very gravelly moderately coarse textured throughout. They are underlain by bedrock.

The Genoa soils are moderately sloping to steep and shallow. These soils are moderately coarse textured in the surface layer and very gravelly or cobbly moderately fine textured in the subsoil. They are underlain by bedrock.

The Sup soils are moderately steep to steep and very deep. These soils are very gravelly moderately coarse textured throughout.

Of minor extent in this unit are Chen, Pernty, and Softscrabble soils. The Chen and Pernty soils are on ridges, and the Softscrabble soils are on pediments.

The soils in this unit are used for rangeland and rangeland wildlife habitat.

The main limitation for rangeland and rangeland wildlife use is the steepness of slope. Genoa soils are limited by the shallow depth to bedrock. Cold soil temperatures of the Genoa and Sup soils limit plant growth.

14. Vicee-Franktown-Rock outcrop

Steep to very steep, very shallow, shallow, and very deep, well drained and somewhat excessively drained soils; on mountains

Areas of this map unit are in the central part of the Carson Range west of Genoa. They are on the lower part of mountainsides. The vegetation is mainly Jeffrey pine with understory of mountain big sagebrush, antelope bitterbrush, mountainmahogany, and Thurber needlegrass.

This unit makes up about 1.5 percent of the survey area. Most extensive in this unit are Vicee and Franktown soils and Rock outcrop.

The Vicee soils are steep to very steep, very deep, and well drained. These soils are medium textured throughout.

The Franktown soils are very steep, very shallow to shallow, and somewhat excessively drained. The surface is very stony. These soils are very gravelly and medium textured throughout. They are underlain by bedrock.

Rock outcrop is mainly on ridges but is on some side slopes. It consists of exposed areas of barren bedrock. Some plants grow in the crevices of bedrock.

Of minor extent in this unit are Gralic, Vicee Variant, and Shakespeare soils. These soils are at a higher elevation on the sides of mountains. The Gralic and Shakespeare soils are deep, very gravelly, and medium textured. The Vicee Variant soils are moderately deep, very gravelly, and medium textured. The Shakespeare soils are moderately well drained. Vegetation is similar to that of the major soils.

The soils in this unit are used for woodland and woodland wildlife habitat.

The main limitations for woodland and woodland wildlife habitat are the hazard of erosion and steepness of slope. The Franktown soils are limited by shallow depth to bedrock. Rock outcrop is a limitation.

15. Corbett-Toiyabe

Moderately sloping to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils; on lower mountainsides

Areas of this map unit are in the northern and southern parts of the Carson Range. They are on the lower mountainsides. The vegetation is primarily Jeffrey pine with an understory of mountain big sagebrush, snowbrush ceanothus, antelope bitterbrush, and bottlebrush squirreltail.

This unit makes up about 3 percent of the survey area. The most extensive soils in this unit are the Corbett and Toiyabe soils.

The Corbett soils are moderately sloping to steep, moderately deep, and somewhat excessively drained. These soils are coarse textured throughout. They are underlain by soft bedrock.

The Toiyabe soils are moderately sloping to very steep, shallow, and excessively drained. These soils are coarse textured throughout. They are underlain by granitic bedrock.

Of minor extent in this unit are Glenbrook soils and Rock outcrop. The Glenbrook soils are shallow, gravelly, and coarse textured. They are on foothills. Vegetation is Wyoming big sagebrush and antelope bitterbrush.

The soils in this unit are used mainly for woodland and woodland wildlife habitat. Some areas are used for urban development.

The main limitation for woodland, woodland wildlife, and urban development is steepness of slope in most areas; however, slopes are moderate in a few small areas. The Toiyabe soils are also limited by shallow depth to bedrock.

16. Witefels-Temo

Moderately sloping to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils; on upper mountainsides

Areas of this unit are mainly in the northern and southern parts of the Carson Range. They are on the upper mountainsides. The vegetation is mainly California red fir and western white pine with an understory of pinemat manzanita, snowbrush ceanothus, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail.

This unit makes up about 2 percent of the survey area. The most extensive soils in this unit are the Witefels and Temo soils.

The Witefels soils are moderately sloping to very steep, moderately deep, and somewhat excessively drained. These soils are coarse textured throughout. They are underlain by soft bedrock.

The Temo soils are steep to very steep, shallow, and excessively drained. These soils are coarse textured throughout. They are underlain by bedrock.

Of minor extent in this unit are Graylock soils and Rock outcrop. The Graylock soils are on concave side slopes of mountains. The Rock outcrop is mostly on ridges.

The soils in this unit are used for woodland and woodland wildlife habitat. Some areas are used for urban development and ski areas.

The main limitations for woodland and woodland wildlife habitat are steepness of slope and cool soil temperatures. The Temo soils are limited by shallow depth to bedrock. Urban development is limited mainly by steepness of slope. Ski areas are limited by stones.

Broad Land Use Considerations

The soils in the Douglas County Area vary widely in their potential for major land uses, such as cropland,

pastureland, rangeland, woodland, wildlife habitat, and urban development.

Approximately 70 percent of the survey area is used for rangeland. Units 5, 6, 7, 8, 9, 10, 12, and 13 on the general soil map are used primarily for grazing by cattle and sheep. Feral horses also graze the areas, and their needs should be considered. The areas are readily accessible and commonly are overgrazed. In general, the primary limitation for rangeland is low forage production caused by low palatability of the sagebrush and steepness of slope. Encroachment or invasion of pinyon and juniper has occurred on much of the moderately steep and steep rangeland. Improving range conditions by mechanical operations should be restricted to only selected soils that support big sagebrush. Removing the low sagebrush increases the hazard of erosion, and seeding low sagebrush sites is difficult because of the thin surface layer.

About 15 percent of the survey area can be used for woodland. Units 14, 15, and 16 on the general soil map can be used to produce trees. Erosion is a hazard; therefore, logging operations should be carefully planned to prevent soil erosion. The use of equipment is limited by steepness of slope, and in some areas by stoniness. Map unit 11 can be used to produce firewood, fenceposts, and Christmas trees. Pinyon pine nuts can be harvested in some years. Cutting of trees should be planned to coincide with dry soil conditions to prevent compaction of the soil, thereby causing increased erosion.

Approximately 5 percent of the survey area is used for various intensities of urban development. Units 1, 2, 3, 4, 5, 6, 7, and 15 on the general soil map are used for some kind of urbanization. Map units 1, 2, 3, and 4 are primarily limited by the hazard of flooding and the seasonal high water table. Some of the soils in map units 5 and 6 are limited by rare flooding. The soils in map unit 7 have a high clay content in the subsoil that limits urban uses. The steepness of slope and shallow depth to bedrock in map unit 15 require special design or use of special equipment for urban development.

About 10 percent of the survey area is used for hay and pasture. Units 1, 2, and 4 on the general soil map are used for winter grazing. The soils in map unit 1 have a high sodic content, have a shallow seasonal high water table, and are subject to periodic flooding. Drainage is difficult in map unit 1 because the soils do not have a suitable outlet. Forage production is low because of the high sodic content. The soils in map unit 4 have a high sodic content and a moderately deep seasonal high water table. Forage production is low because of the high sodic content. Parts of unit 2 are suited to hay and pasture. Meadow hay can be cut in most years, and the aftermath grazed late in summer and in winter.

Approximately 5 percent of the survey area is used for cropland. Parts of units 2, 3, and 5 are used for small grains, alfalfa, and other legume crops. The soils are generally free of salt and alkali. Small grains and other shallow-rooted crops can be grown in parts of unit 2 and on the Dressler soils in unit 3. Alfalfa and other deep-rooted crops can be grown in unit 5 and on the Hussman and Ormsby soils in unit 3. Most of the soils in units 2 and 3 and in parts of unit 5 have irrigation water available. If irrigation water can be made available, most of unit 5 is suitable for cropland. Irrigation water comes mainly from the Carson River. In most years it is available until midsummer and then becomes short in supply. Some irrigation water comes from wells. Wells that produce enough water are deep, and in most of unit 5 are difficult to find.

Parts of units 2 and 3 are being used to filter and purify effluvent generated from the nearby cities. The effluvent is stored when the soil is frozen; when the soil thaws and at other times, the effluvent is diluted with river water or applied directly to the soil by spraying or by the furrow and border irrigation methods. Crops grown on the soils used in this process of purification are mainly hay or legumes and are feed for nonlactating cows. Much of unit 5 can be used for this filtering and purification process.

Almost all of the land in the Douglas County Area is used by more than one kind of wildlife. The east and west forks of the Carson River and the West Walker River support trout. In the lower part of Carson Valley, the Carson River supports catfish and trout.

Openland wildlife common to cultivated areas include pheasant, valley quail, cottontail rabbit, meadowlark, and killdeer. Units 1, 2, 3, and 4 shown on the general soil map are used extensively by these species.

Wetland wildlife are common in map units 1 and 2. These include ducks, geese, herons, muskrat, and beaver. Map units 1 and 2 are the only areas that support wetland wildlife to any great extent. Shallow water areas could be established to enhance the habitat. Some areas have been drained by stream entrenchment and are now limited in their ability to provide habitat for wetland wildlife.

Map units 5, 6, 7, and 10 support most of the rangeland wildlife. Common rangeland wildlife includes jack rabbits, coyote, chukar partridge, and many kinds of rodents and nongame birds. During winter deer utilize the habitat adjacent to the mountains and along drainageways.

Woodland wildlife extensively use map units 11, 12, 13, 14, 15, and 16. Common to these areas are mule deer, black bear, mountain lion, and a few wild turkeys. Small game includes cottontail and pygmy rabbits. Upland game birds, such as mountain and valley quail and blue grouse, also inhabit the areas.

Problems associated with management of wildlife and wildlife habitat have been increased by urban expansion. The increase of homes in rural areas, expansion of cities, and building of highways have destroyed or

isolated much of the wildlife habitat on valley floors. Winter feeding areas and deer migration routes across Carson Valley, Antelope Valley, and the Double Spring Flat Area have been severely constricted. Selected areas suited to wildlife habitat, winter grazing areas, and migration corridors can be enhanced and preserved.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Gardnerville clay loam is one of several phases in the Gardnerville series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Corbett-Toiyabe complex, 30 to 50 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. The Washoe-Reno association is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps. The range sites given for included soils and at the end of the map unit description coincide with the range sites given in table 6.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

101—Aldax stony fine sandy loam, 15 to 50 percent slopes. This shallow, well drained soil is on low rolling foothills. It formed in residuum derived dominantly from andesite. Elevation is 5,000 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony fine sandy loam that grades to extremely stony fine sandy loam. It is about 14 inches thick. Below this is andesite bedrock. In some areas the surface is very stony.

Included with this soil in mapping is about 2 percent Rock outcrop on ridge crests.

Permeability of this Aldax soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat. Some areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber

needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and steep slopes. Because of the very low available water capacity and competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Mechanical treatment is not practical, because the surface is stony and most slopes are steep. Steepness of slope limits access by livestock and promotes overgrazing of the less sloping areas. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect this soil from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing.

The main limitations for urban development are moderately steep or steep slopes and shallow depth to hard bedrock. The deep cuts needed to level sites for buildings can expose the bedrock. Special design is needed for buildings and waste disposal systems.

Areas of this soil are limited for roads because of moderately steep or steep slopes and shallow depth to hard bedrock. Deep cuts should be avoided because of shallow depth to hard bedrock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIe, nonirrigated. It is in range site 26-15.

102—Aldax-Indiano association. This association is on low rolling foothills. Slope is 15 to 50 percent. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 120 days.

This association is 45 percent Aldax very stony fine sandy loam, 15 to 50 percent slopes, and 45 percent Indiano stony fine sandy loam, 30 to 50 percent slopes. The Aldax soil is on ridges and south- and west-facing side slopes. The Indiano soil is on north- and east-facing side slopes.

Included with these soils in mapping are about 2 percent Rock outcrop on ridge crests and 8 percent Stodick soils on foot slopes (range site: 26-25). The included soils and Rock outcrop make up about 10 percent of mapped areas.

The Aldax soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony fine sandy loam that grades to extremely stony fine sandy loam. It is about 14 inches thick. Below this is andesite bedrock. In some areas the surface is extremely stony.

Permeability of this Aldax soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Indiano soil is moderately deep and well drained. It formed in colluvium derived dominantly from rhyolite. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony fine sandy loam about 13 inches thick. The subsoil is pale brown gravelly clay loam about 20 inches thick. Rhyolite bedrock is at a depth of 33 inches. In some areas the surface is extremely stony.

Permeability of this Indiano soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Aldax soil is mainly Wyoming big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Indiano soil is mainly Wyoming big sagebrush, antelope bitterbrush, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect these soils from excessive erosion and to avoid overuse of the less sloping areas of the Aldax soil. Loss of the surface layer results in a severe decrease in productivity and the potential of the unit to produce vegetation suitable for grazing. Because of the very low and low available water capacity of these soils and the competition from the sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the moderately steep and steep slopes and the shallow or moderately deep hard bedrock. Because of the underlying bedrock, deep cuts should be avoided, especially on the Aldax soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Aldax soil is in capability subclass VIIe, nonirrigated, and range site 26-15. The Indiano soil is in capability subclass VIIe, nonirrigated, and range site 26-10.

111—Borda gravelly sandy loam, 4 to 15 percent slopes. This deep, well drained soil is on foothills and toe slopes of foothills. It formed in residuum derived dominantly from andesite tuff. Elevation is 5,200 to 5,800 feet. The average annual precipitation is about 10 inches, the average annual air temperature is about 48 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown and brown gravelly sandy loam and gravelly loam about 10 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 50 inches is very pale brown and light yellowish brown clay loam. Andesite tuff bedrock is at a depth of 50 inches.

Included with this soil in mapping are about 7 percent Aldax soils near outcrops of rock (range site: 26-15) and 3 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 10 percent of mapped areas.

Permeability of this Borda soil is slow. Available water capacity is high. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 60 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. Pinyon and juniper have invaded some areas. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing when the soil is wet results in compaction of the surface layer and excessive runoff. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Roads must be designed to control runoff and help stabilize cut slopes. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIc, nonirrigated. It is in range site 26-10.

121—Borda Variant-Genoa-Burnborough Variant association. This association is on pediments, ridges, and north- and east-facing side slopes of mountains. Slope is 15 to 50 percent. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 70 days.

This association is 40 percent Borda Variant extremely cobbly sandy loam, 15 to 30 percent slopes, 30 percent Genoa extremely cobbly sandy loam, 15 to 50 percent slopes, and 15 percent Burnborough Variant stony loam, 15 to 30 percent slopes. The Borda Variant soil is on mountain pediments on edges of mountain valleys, the Genoa soil is on the surrounding ridges and shoulders, and the Burnborough Variant soil is on north- and east-facing concave side slopes below the ridges.

Included with these soils in mapping are about 2 percent loamy-skeletal, mixed, frigid Cumulic Haplaquolls in narrow drainageways (range site: 26-3), 8 percent Glean soils on concave north-facing slopes (range site: 26-38), and 5 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Borda Variant soil is very deep and well drained. It formed in alluvium and colluvium derived from old alluvium. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is grayish brown extremely cobbly sandy loam about 6 inches thick. The upper 21 inches of the subsoil is brown very gravelly sandy clay. The lower part of the subsoil to a depth of 60 inches or more is light yellowish brown very gravelly sandy clay loam.

Permeability of the Borda Variant soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is grayish brown extremely cobbly sandy loam about 6 inches thick. The subsoil is brown extremely cobbly sandy clay loam about 10 inches thick. Granitic bedrock is at a depth of 16 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting

depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Burnborough Variant soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 5 inches thick. The subsoil is brown gravelly clay loam about 25 inches thick. Soft andesite bedrock is at a depth of 30 inches.

Permeability of the Burnborough Variant soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Borda Variant soil is mainly low sagebrush, antelope bitterbrush, pine bluegrass, and Thurber needlegrass. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the extremely cobbly surface and the very low available water capacity of the surface layer.

The potential plant community on the Genoa soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, Sandberg bluegrass, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity, extremely cobbly surface, and steep slopes.

The potential plant community on the Burnborough Variant soil is mainly mountain big sagebrush, antelope bitterbrush, mountain brome, and Columbia needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Columbia needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately steep slopes and low available water capacity.

Seeding large areas of Burnborough Variant soil is difficult. This is because of the pattern in which this soil occurs with the Borda Variant and Genoa soils. Grazing should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and the potential of the Genoa soil to produce vegetation suitable for grazing.

This association is limited for roads because of moderately steep and steep slopes and because of the shallow depth to bedrock and large stones on the Genoa soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, cobbles in the soil are road hazards and result in increased maintenance cost.

The Borda Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-39. The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28. The Burnborough Variant soil is in capability subclass VIe, nonirrigated, and range site 26-40.

122—Borda Variant-Glean association. This association is on the slopes of mountains. Slope is 15 to 50 percent. Elevation is 8,000 to 8,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 75 days.

This association is 40 percent Borda Variant very cobbly sandy loam, 30 to 50 percent slopes, 30 percent Borda Variant very gravelly sandy loam, 15 to 30 percent slopes, and 15 percent Glean very stony sandy loam, 15 to 30 percent slopes. The Borda Variant soil, 30 to 50 percent slopes, is on east-facing mountain side slopes, the Borda Variant soil, 15 to 30 percent slopes, is on west-facing mountain side slopes, and the Glean soil is on concave north-facing mountain side slopes.

Included with these soils in mapping are about 10 percent Genoa soils on ridges (range site: 26-28), 3 percent loamy-skeletal, mixed, frigid Cumulic Haplaquolls in narrow drainageways (range site: 26-3), and 2 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Borda Variant soil, 30 to 50 percent slopes, is very deep and well drained. It formed in colluvium derived dominantly from old alluvium. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly sandy loam about 6 inches thick. The upper 33 inches of the subsoil is brown and dark yellowish brown very gravelly clay. The lower part of the subsoil to a depth of 60 inches or more is light yellowish brown very gravelly sandy clay loam.

Permeability of the Borda Variant soil, 30 to 50 percent slopes, is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more.

Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Borda Variant soil, 15 to 30 percent slopes, is very deep and well drained. It formed in colluvium derived dominantly from old alluvium. Typically, the surface is covered with 40 to 50 percent pebbles. The surface layer is grayish brown very gravelly sandy loam about 4 inches thick. The subsoil is brown and yellowish brown very gravelly clay about 30 inches thick. The substratum to a depth of 60 inches is light yellowish brown very gravelly sandy clay loam.

Permeability of the Borda Variant soil, 15 to 30 percent slopes, is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is dark grayish brown very stony sandy loam about 27 inches thick. The upper 15 inches of the underlying material is pale brown very gravelly sandy loam. The lower part of the underlying material to a depth of 60 inches is very pale brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with depth to bedrock. This depth is 40 to 70 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Borda Variant soil, 30 to 50 percent slopes, is mainly low sagebrush, Douglas rabbitbrush, pine bluegrass, and Thurber needlegrass. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity of the surface layer.

The potential plant community on the Borda Variant soil, 15 to 30 percent slopes, is mainly low sagebrush, Thurber needlegrass, pine bluegrass, and prairie junegrass. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity of the surface layer.

The potential plant community on the Glean soil is mainly mountain big sagebrush, western needlegrass, basin wildrye, and spike-fescue. The present vegetation in most areas is mainly mountain big sagebrush, western needlegrass, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity of the surface layer.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth.

Areas of this association are limited for roads because of moderately steep and steep slopes. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Borda Variant soils are in capability subclass VIIs, nonirrigated, and range site 26-39. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38.

123—Borda Variant-Glean-Chen association. This association is on summits, side slopes, and crests of mountains. Slope is 8 to 30 percent. Elevation is 8,000 to 8,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 42 degrees F., and the average frost-free period is about 70 days.

This association is 35 percent Borda Variant very gravelly sandy loam, 15 to 30 percent slopes, 30 percent Glean very gravelly sandy loam, 15 to 30 percent slopes, and 20 percent Chen very stony sandy loam, 8 to 15 percent slopes. The Borda Variant soil is on rounded summits and shoulders, the Glean soil is on concave north- and east-facing side slopes, and the Chen soil is on narrow ridges and rocky crests.

Included with these soils in mapping are about 7 percent Sup soils on east-facing side slopes near the ridges (range site: 26-9), 5 percent very cobbly or loamy Genoa soils that are intermingled with the Chen soils on ridges (range site: 26-28), and 3 percent Rock outcrop on ridge crests. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Borda Variant soil is very deep and well drained. It formed in colluvium derived dominantly from old alluvium. Typically, the surface is covered with 30 to 40 percent pebbles. The surface layer is brown very gravelly sandy loam about 5 inches thick. The upper 7 inches of the subsoil is brown extremely gravelly sandy clay loam, the next 25 inches is brown very gravelly clay, and the lower part of the subsoil to a depth of 60 inches or more

is light yellowish brown extremely gravelly sandy clay loam.

Permeability of the Borda Variant soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived from granitic and andesitic rocks. Typically, the surface is covered with 30 to 40 percent pebbles. The surface layer is grayish brown and brown very gravelly sandy loam about 28 inches thick. The underlying material to a depth of 60 inches or more is brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with depth to bedrock. The depth is 40 to 70 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chen soil is shallow and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony sandy loam about 6 inches thick. The subsoil is very gravelly clay; the upper 3 inches is brown, and the lower 8 inches is yellowish brown. Andesitic bedrock is at a depth of 17 inches.

Permeability of the Chen soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth ranges from 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on this Borda Variant soil is mainly low sagebrush, Thurber needlegrass, pine bluegrass, and prairie junegrass. The present vegetation in most areas is low sagebrush, Thurber needlegrass, and pine bluegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity of the surface layer.

The potential plant community on this Glean soil is mainly mountain big sagebrush, western needlegrass, basin wildrye, and spike-fescue. The present vegetation in most areas is mountain big sagebrush, western needlegrass, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity of the surface layer.

The potential plant community on this Chen soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

Plant growth on soils in this association is limited by the cold soil temperatures. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to prevent overgrazing in the less sloping areas of the Chen soil.

Areas of this association are limited for roads because of moderately steep slopes on the Borda Variant and Glean soils and because of the shallow depth to bedrock in the Chen soil. Because of the bedrock deep cuts should be avoided especially on the Chen soils. Special design for roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Borda Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-39. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38. The Chen soil is in capability subclass VIIs, nonirrigated, and range site 26-28.

124—Borda Variant-Burnborough Variant-Cassiro association. This association is on pediments and slopes of mountains. Slope is 8 to 50 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 85 days.

This association is 50 percent Borda Variant extremely cobbly sandy loam, 8 to 15 percent slopes, 25 percent Burnborough Variant stony loam, 15 to 30 percent slopes, and 10 percent Cassiro stony loam, 15 to 50 percent slopes. The Borda Variant soil is on mountain pediments in mountain valleys, the Burnborough Variant soil is on short north- and east-facing side slopes, and the Cassiro soil is on south- and west-facing side slopes above the pediments.

Included with these soils in mapping are about 4 percent Brockliss Variant soils in drainageways (range site: 26-3), 4 percent Brockliss Variant soils, drained, along drainageways (range site: 26-30), 4 percent Pung soils on lower terraces at the bottom of side slopes (range site; 26-23), and 3 percent Glean soils on north-facing concave slopes near the crests (range site: 26-38). The included soils make up about 15 percent of mapped areas.

The Borda Variant soil is very deep and well drained. It formed in colluvium and alluvium derived dominantly from old alluvium. Typically, the surface layer is grayish brown extremely cobbly sandy loam about 5 inches

thick. The upper 25 inches of the subsoil is brown very gravelly clay. The lower part of the subsoil to a depth of 60 inches is light yellowish brown very gravelly sandy clay loam.

Permeability of the Borda Variant soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Burnborough Variant soil is moderately deep and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface layer is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 6 inches thick. The upper 17 inches of the subsoil is brown gravelly clay loam, and the lower 14 inches is yellowish brown gravelly clay loam. Soft bedrock is at a depth of 37 inches.

Permeability of the Burnborough Variant soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Cassiro soil is very deep and well drained. It formed in alluvium derived dominantly from mixed sources. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 7 inches thick. The upper 15 inches of the subsoil is brown very gravelly clay, and the lower 18 inches is yellowish brown very gravelly clay. The substratum to a depth of 60 inches or more is light brownish gray gravelly and cobbly sandy loam.

Permeability of the Cassiro soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Borda Variant soil is mainly low sagebrush, Thurber needlegrass, pine bluegrass, and prairie junegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the extremely cobbly surface layer and the very low available water capacity of the surface layer.

The potential plant community on the Burnborough Variant soil is mainly mountain big sagebrush, antelope bitterbrush, Columbia needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately steep slopes.

The potential plant community on the Cassiro soil is mainly Wyoming big sagebrush, Thurber needlegrass, Sandberg bluegrass, and basin wildrye, The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the steep slopes.

Seeding large areas of Burnborough Variant soil is difficult. This is because of the pattern in which this soil occurs with the Borda Variant and Cassiro soils. Steepness of slope of the Cassiro soil limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Borda Variant soil. Cold soil temperatures in the Borda Variant and Burnborough Variant soils limit plant growth. Grazing therefore should be delayed until these soils have warmed up and the plants have achieved sufficient growth. Livestock grazing should be managed to protect the soils from excessive erosion.

Areas of this association are limited for roads because of steep and moderately steep slopes on the Cassiro and Burnborough Variant soils. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Borda Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-39. The Burnborough Variant soil is in capability subclass VIe, nonirrigated, and range site 26-40. The Cassiro soil is in capability subclass VIIs, nonirrigated, and range site 26-10.

141—Brockliss stony loamy sand, 0 to 8 percent slopes. This very deep, somewhat poorly drained soil is on undulating flood plains. It formed in alluvium derived dominantly from granitic rock but also from volcanic flow rocks. Elevation is about 4,800 feet. The average annual precipitation is about 9 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is 100 to 120 days.

Typically, the surface layer is dark grayish brown and dark brown stony loamy sand about 15 inches thick. The upper 8 inches of the underlying material is brown very stony loamy sand, and the lower part to a depth of 60

inches is white, pale brown, and light yellowish brown very stony coarse sand.

Included with this soil in mapping are small areas of Brockliss soils that are in swales, have a seasonal high water table at a depth of 1.5 to 3.5 feet, and have an organic layer 2 to 4 inches thick on the surface.

Permeability of this Brockliss soil is rapid. Available water capacity is very low. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 6 feet from December through May. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional flooding in December through March.

Most areas of this soil are used for irrigated hay, pasture, and wildlife habitat. A few areas have been cleared of stones and are used for growing alfalfa.

This soil is suited to hay and pasture. The main limitations are the stony surface and very low available water capacity. Sprinkler irrigation is suited to this soil. Because this soil is droughty and has rapid water infiltration, applications of irrigation water should be light and frequent. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This Brockliss soil is limited for roads because of stones in the profile and occasional flooding. Structures to protect this soil from flooding are difficult to establish and maintain. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are hazards to roads and result in increased maintenance costs.

This soil is in capability subclass VIw, irrigated.

151—Cagle-Deven-Nosrac association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 5,500 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 35 percent Cagle very stony loam, 15 to 30 percent slopes, 25 percent Deven very stony loam, 15 to 30 percent slopes, and 25 percent Nosrac very stony loam, 30 to 50 percent slopes. The Cagle soil is on south-facing side slopes, the Deven soil is on west-facing side slopes and ridges, and the Nosrac soil is on north-facing side slopes.

Included with these soils in mapping are about 7 percent Duco soils on shoulders and upper side slopes (woodland site: Pinyon-juniper woodland), 3 percent Indian Creek soils on nearly level basin-fill terraces along the lower edges of the unit (range site: 26-25), and 5 percent Rock outcrop on ridges and spurs. The included soils and Rock outcrop make up about 15 percent of the mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 2 inches thick. The upper 15 inches of the subsoil is dark grayish brown gravelly clay, and the lower 13 inches is light olive brown very gravelly clay. Weathered andesite bedrock is at a depth of 30 inches. In some areas slope is 8 to 50 percent.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Deven soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 15 inches thick. Hard andesite bedrock is at a depth of 17 inches.

Permeability of the Deven soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 8 inches thick. The upper 27 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is olive gray very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Cagle and Deven soils are suited to the production of singleleaf pinyon pine and Utah juniper. They can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the moderately steep slopes, surface stones, and low strength of the soil when wet.

Stones on the surface and the steepness of slope interfere with the use of equipment on the Cagle and Deven soils. Plant competition and low and very low available water capacities delay natural regeneration but do not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community of the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate

available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

In areas of the Nosrac soil, steepness of slope limits the access and movement of livestock. Livestock grazing should be managed to protect this soil from excessive erosion and to prevent overgrazing in the less sloping areas of included soils. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes, the highly expandable clay in the Cagle subsoil, and the shallow depth to bedrock in the Deven soil. Roads on the Cagle soil are difficult to maintain because of the clay, which has low strength when wet. Because of the underlying bedrock, deep cuts should be avoided, especially on the Deven soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Cagle soil is in capability subclass VIIs, nonirrigated. The Deven soil is in capability subclass VIIe, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

152—Cagle-Duco association. This association is on slopes of mountains. Slope is 30 to 50 percent. Elevation is 6,500 to 7,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Cagle extremely stony loam, 30 to 50 percent slopes, and 35 percent Duco very cobbly fine sandy loam, 30 to 50 percent slopes. The Cagle soil is on south- and west-facing side slopes, and the Duco soil is on east-facing side slopes.

Included with these soils in mapping are about 5 percent Nosrac soils on north-facing concave side slopes (range site: 26-5), 6 percent Deven soils on ridges (woodland site: Pinyon-juniper woodland), and 4 percent Rock outcrop on ridge crests and convex side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from andesite rock. Typically, the surface is covered with 15 to 35 percent stones and cobbles and about 30 to 40 percent pebbles. The surface layer is grayish brown extremely stony loam about 4 inches thick. The upper 12 inches of the subsoil is dark grayish brown gravelly clay, and the lower 8 inches is brown very gravelly clay. Weathered bedrock is at a depth of 24 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 20 to 30 percent cobbles and 20 to 30 percent pebbles. The surface layer is grayish brown very cobbly fine sandy loam about 4 inches thick. The subsoil is dark brown very gravelly clay loam about 10 inches thick. Andesite bedrock is at a depth of 14 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland and wildlife habitat.

The Cagle soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are steep slopes, the high hazard of erosion, and the extremely stony surface.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are steep slopes, shallow depth to bedrock, and the high hazard of erosion.

Stones on the surface and steepness of slope can interfere with the use of equipment. The low and very low available water capacities of these soils generally influence seedling survival in areas where understory plants are numerous. The shallow depth to bedrock in the Duco soil delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Because the Cagle soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Minimizing the risk of erosion is essential in harvesting trees.

Areas of these soils are limited for roads because of steep slopes, the highly expandable clay subsoil in the Cagle soil, and the shallow depth to bedrock and high content of cobbles and stones in the Duco soil. Roads on the Cagle soil are difficult to maintain because of the clay, which has low strength when wet. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with

adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Cagle soil is in capability subclass VIIs, nonirrigated. The Duco soil is in capability subclass VIIe, nonirrigated.

153—Cagle-Duco-Rock outcrop association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 5,000 to 6,100 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 50 percent Cagle very stony loam, 15 to 50 percent slopes, 25 percent Duco extremely stony loam, 15 to 50 percent slopes, and 20 percent Rock outcrop. The Cagle soil is on south-facing side slopes, the Duco soil is on convex ridges and shoulders, and Rock outcrop is on ridges and spurs.

Included with these soils in mapping are about 2 percent Springmeyer soils on toe slopes and alluvial fans along the lower edges of the unit (range site: 26-10), 2 percent Brockliss Variant soils, drained, on stream terraces along drainageways (range site: 26-30), and 1 percent Brockliss soils along drainageways (range site: 26-3). The included soils make up about 5 percent of mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 3 inches thick. The upper 14 inches of the subsoil is dark grayish brown gravelly clay, and the lower 13 inches is olive gray very gravelly clay. Weathered andesite bedrock is at a depth of 30 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to soft bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Hard andesite bedrock is at a depth of 19 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to hard bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this association are used for woodland and wildlife habitat.

The Cagle soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are steep slopes, very stony surfaces, the high hazard of erosion, and clayey subsoil. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are steep slopes, extremely stony surfaces, and the high hazard of erosion. The very low available water capacity generally influences seedling survival in areas where the understory plants are numerous.

In areas that are used for woodland, stones on the surface and steepness of slope can interfere with the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

Areas of this association are limited for roads because of moderately steep and steep slopes, the highly expandable clay subsoil in the Cagle soil, and the shallow depth to bedrock and high content of stones and cobbles in the Duco soil. Roads on the Cagle soil are difficult to maintain because of the clay, which has low strength when wet. Deep cuts should be avoided, especially on the Duco soil, because of the underlying bedrock. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Cagle soil is in capability subclass VIIs, nonirrigated, and the Duco soil is in capability subclass VIIe, nonirrigated.

154—Cagle-Nosrac association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 5,600 to 7,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 47 degrees F., and the average frost-free period is about 90 days.

This association is 60 percent Cagle very stony loam, 15 to 50 percent slopes, and 25 percent Nosrac stony clay loam, 30 to 50 percent slopes. The Cagle soil is on south-facing side slopes, and the Nosrac soil is on north-facing side slopes.

Included with these soils in mapping are about 5 percent Duco soils on convex ridges (woodland site:

Pinyon-juniper woodland), 5 percent Deven soils in pockets and convex positions on ridges (woodland site: Pinyon-juniper woodland), 3 percent Rock outcrop on crests of ridges, and 2 percent Pung soils on small mountain valley terraces (range site: 26-23). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 4 inches thick. The subsoil is dark grayish brown gravelly clay about 24 inches thick. Weathered andesite bedrock is at a depth of 28 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony clay loam about 9 inches thick. The upper 25 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is olive gray very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Cagle soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are slope, the very stony surface layer, and clay subsoil. Stones on the surface and steepness of slope can interfere with the use of equipment. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Because of the density of pinyon and juniper in most areas, these areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes and the highly expandable clay in the Cagle subsoil. Roads on the Cagle soil are difficult to maintain because of the clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Cagle soil is in capability subclass VIIs, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

155—Cagle-Nosrac-Borda association. This association is on slopes and pediments of mountains. Slope is 4 to 50 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 95 days.

This association is 50 percent Cagle very stony loam, 15 to 50 percent slopes, 20 percent Nosrac very stony loam, 30 to 50 percent slopes, and 15 percent Borda very cobbly clay loam, 4 to 15 percent slopes. The Cagle soil is on south- and west-facing side slopes, the Nosrac soil is on north- and east-facing slopes, and the Borda soil is on toe slope pediments.

Included with these soils in mapping are about 5 percent Rock outcrop on ridge crests, 5 percent very cobbly Deven soils on shoulders of ridges (range site: 26-23), and 5 percent Springmeyer soils on alluvial fans along the base of mountains (range site: 26-10). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 3 inches thick. The upper 15 inches of the subsoil is dark grayish brown gravelly clay, and the lower 12 inches is olive gray very gravelly clay. Weathered andesite bedrock is at a depth of 30 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 7 inches thick. The upper 25 inches of the subsoil is brown very gravelly clay loam, and the lower 28 inches is olive very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Borda soil is deep and well drained. It formed in residuum derived dominantly from andesite tuff. Typically, the surface is covered with 10 to 15 percent cobbles. The surface layer is grayish brown very cobbly clay loam about 5 inches thick. The subsoil is brown clay about 30 inches thick. The substratum is light yellowish brown clay loam about 15 inches thick. Below this is andesite tuff bedrock.

Permeability of the Borda soil is slow. Available water capacity is high. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 60 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Cagle soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are moderately steep and steep slopes, the high hazard of erosion, very stony surface, and clayey subsoil. Plant competition and the low available water capacity delay natural regeneration of trees but do not prevent the eventual development of a fully stocked, normal stand. Conventional methods of harvesting trees can be used in the more gently sloping areas, but are difficult to use in the steeper areas. Because the soil is sticky when wet, harvesting equipment should be used only during dry periods. Stones on the surface and steepness of slope can interfere with the use of equipment. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of the density of pinyon and juniper in most areas, these areas can be managed for woodland. Reestablishment of the rangeland plant community may be difficult.

The potential plant community on the Borda soil is mainly Wyoming big sagebrush, Thurber needlegrass, and pine bluegrass. The present plant community is mainly Wyoming big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are moderate average annual precipitation and the very cobbly surface.

Because of the competition from sagebrush for moisture on the Nosrac and Borda soils, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Borda soil to produce plants suitable for grazing. Grazing should be delayed until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Seeding large areas of the Borda soil is difficult. This is because of the pattern in which this soil occurs with the Cagle and Nosrac soils. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Borda soil.

Areas of this association are limited for roads because of steep slopes on the Cagle and Nosrac soils and highly expandable clay in the subsoil of the Cagle and Borda soils. Roads on the Cagle and Borda soils are difficult to maintain because of the clay, which has low strength when wet. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

The Cagle soil is in capability subclass VIIs, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Borda soil is in capability subclass VIIs, nonirrigated, and range site 26-10.

156—Cagle-Burnborough-Rock outcrop association. This association is on slopes of mountains. Slope is 30 to 50 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 45 degrees F., and the average frost-free period is about 85 days.

This association is 50 percent Cagle very stony loam, 30 to 50 percent slopes, 30 percent Burnborough stony loam, 30 to 50 percent slopes, and 10 percent Rock

outcrop. The Cagle soil is on south- and west-facing convex side slopes, the Burnborough soil is on north- and east-facing side slopes, and Rock outcrop is on ridges and side slopes.

Included with these soils in mapping are about 5 percent Duco soils on ridges and the upper part of south-facing slopes (woodland site: Pinyon-juniper woodland), 3 percent Oppio soils on south-facing concave side slopes (range site: 26-10), 1 percent Brockliss Variant soils on narrow valley bottoms (range site: 26-3), and 1 percent Brockliss Variant soils, drained, along drainageways above the bottoms (range site: 26-30). The included soils make up about 10 percent of mapped areas.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 3 inches thick. The upper 25 inches of the subsoil is brown gravelly clay, and the lower 7 inches is pale brown very gravelly clay. Soft bedrock is at a depth of 35 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 14 inches thick. The subsoil is light brownish gray very gravelly clay loam about 19 inches thick. The substratum to a depth of 60 inches is pale brown very gravelly loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren rock and less than 10 percent soil material.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Cagle soil is suited to production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. Recently burned-over or logged-off areas can be grazed until competition from trees eliminates the grazable forage. The young trees can be cut for use as Christmas trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The steepness of slope limits the kinds of equipment that can be used. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by moderate available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of included soils. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Because of the density of pinyon and juniper in most areas, these areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes, outcrops of rock, and the highly expandable clay in the subsoil of the Cagle soil. Roads on the Cagle soil are difficult to maintain because of the clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Cagle soil is in capability subclass VIIs, nonirrigated. The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Rock outcrop is in capability subclass VIIIs, nonirrigated.

161—Witefels-Rock outcrop complex, 4 to 15 percent slopes. This complex is on slopes of mountains. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 37 degrees F., and the average frost-free period is about 45 days.

This complex is 85 percent Witefels loamy coarse sand, 4 to 15 percent slopes, and 10 percent Rock outcrop. The Witefels soil is on mountain side slopes and toe slopes, and the Rock outcrop is on ridges and side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 3 percent Graylock soils that are deep and extremely stony on toe slopes (woodland site: Pine-fir woodland) and 2 percent shallow Temo soils near areas of Rock outcrop (woodland site: Pine-fir woodland). The included soils make up about 5 percent of mapped areas.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived

dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 2 inches thick. The surface layer is grayish brown loamy coarse sand about 5 inches thick. The underlying material to a depth of 40 inches is pale brown gravelly loamy coarse sand. Partially weathered granitic bedrock is at a depth of 40 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Rock outcrop consists of barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland, recreation, urban development, and wildlife habitat.

The Witefels soil is suited to the production of California red fir. Based on a site index of 60, the potential production per acre of merchantable timber is 16,700 cubic feet or 119,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concern in producing and harvesting trees is the very low available water capacity. Rock outcrop can interfere with the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Hand planting of nursery stock is generally necessary to establish or improve a stand. Conventional methods of harvesting can be used. Harvesting is limited during November through May.

The main limitations for urban development are moderate depth to bedrock, unstable sidewalls in cutbanks, inadequate filtration of septic tank effluent, and strong slopes. The deep cuts needed to level sites for buildings can expose bedrock. Preserving the existing plant cover during construction helps to control erosion. Cutbanks are not stable and are subject to slumping. Effluent from absorption fields can surface in downslope areas.

Areas of the complex are limited for roads because of the strong slopes and because of outcrops of rock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIs, nonirrigated.

162—Witefels-Rock outcrop complex, 15 to 30 percent slopes. This complex is on slopes and ridges of mountains. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 40 degrees F., and the average frost-free period is about 45 days.

This complex is 75 percent Witefels gravelly loamy coarse sand, 15 to 30 percent slopes, and 15 percent Rock outcrop. The Witefels soil is on mountain side slopes and toe slopes, and Rock outcrop is on the crests of ridges and on some side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent deep extremely stony Graylock soils on foot slopes (woodland site: Pine-fir woodland) and 5 percent shallow Temo soils on ridges (woodland site: Pine-fir woodland). The included soils make up about 10 percent of mapped areas.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 1 inch thick. The surface layer is grayish brown gravelly loamy coarse sand about 3 inches thick. The underlying material to a depth of 31 inches is light brownish gray gravelly coarse sand. Weathered bedrock is at a depth of 31 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Witefels soil is suited to the production of California red fir and white fir. Based on a site index of 60, the potential production per acre of merchantable timber is 16,700 cubic feet or 119,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very low available water capacity and moderate hazard of erosion. Rock outcrop can interfere with the use of equipment. Management that minimizes the risk of erosion is essential in harvesting timber. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Conventional methods of harvesting can be used. Harvesting is limited during November through May.

Areas of this complex are limited for roads because of moderately steep slopes and outcrops of rock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and

maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIs, nonirrigated.

163—Witefels-Rock outcrop complex, 30 to 50 percent slopes. This complex is on the slopes and ridges of mountains. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 40 degrees F., and the average frost-free period is 45 days.

The complex is 70 percent Witefels gravelly loamy coarse sand, 30 to 50 percent slopes, and 15 percent Rock outcrop. Witefels soil is on mountain side slopes, and Rock outcrop is on the crests of ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 10 percent deep, extremely stony Graylock soils on toe slopes (woodland site: Pine-fir woodland) and 5 percent shallow Temo soils on ridges (woodland site: Pine-fir woodland). The included soils make up about 15 percent of mapped areas.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 1 inch thick. The surface layer is brown gravelly loamy coarse sand about 8 inches thick. The underlying material to a depth of 32 inches is pale brown gravelly loamy coarse sand. Weathered granite bedrock is at a depth of 32 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Witefels soil is suited to the production of California red fir and white fir. Based on a site index of 60, the potential production per acre of merchantable timber is 16,700 cubic feet or 119,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the moderate hazard of erosion, very low available water capacity, and steep slopes. The outcrops of rock can interfere with felling and other operations. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Management that minimizes the risk of erosion is essential in harvesting trees. Conventional methods of harvesting are difficult because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting. Use of these methods is limited during November through May.

Areas of this complex are limited for roads because of the steep slopes and outcrops of rock. Special design of roads is needed to overcome the limitation of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIs, nonirrigated.

164—Witefels-Rock outcrop complex, 50 to 75 percent slopes. This complex is on slopes of mountains. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 45 degrees F., and the average frost-free period is about 40 days.

This complex is 65 percent Witefels gravelly loamy coarse sand, 50 to 75 percent slopes, and 20 percent Rock outcrop. The Witefels soil is on mountain side slopes, and Rock outcrop is on ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 10 percent shallow Temo soils on crests of ridges (woodland site: Pine-fir woodland) and 5 percent deep, extremely stony Graylock soils on toe slopes (woodland site: Pine-fir woodland). The included soils make up about 15 percent of mapped areas.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is grayish brown gravelly loamy coarse sand about 3 inches thick. The underlying material to a depth of 40 inches is light brownish gray gravelly loamy coarse sand. Weathered granite bedrock is at a depth of 40 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Witefels soil is suited to the production of California red fir. Based on a site index of 60, the potential production per acre of merchantable timber is 16,700 cubic feet or 119,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100

years old. The main concerns in producing and harvesting trees are the very steep slopes, moderate hazard of erosion, and very low available water capacity. Management that minimizes the risk of erosion is essential in harvesting trees. Conventional methods of harvesting are difficult to use because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited during November through May. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous.

Areas of this complex are limited for roads because of very steep slopes. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIs, nonirrigated.

165—Witefels-Temo complex, 30 to 75 percent slopes. This complex is on the slopes and ridges of mountains. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 40 degrees F., and the average frost-free period is about 50 days.

This complex is 65 percent Witefels gravelly sand, 30 to 50 percent slopes, and 20 percent Temo gravelly coarse sand, 50 to 75 percent slopes. The Witefels soil is on side slopes and toe slopes, and the Temo soil is on ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 10 percent deep, extremely stony Graylock soils on toe slopes and near draws (woodland site: Pine-fir woodland) and about 5 percent Rock outcrop on ridges and side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 1 inch thick. The surface layer is dark gray gravelly sand about 4 inches thick. The underlying material to a depth of 39 inches is light brownish gray gravelly loamy coarse sand. Soft granite bedrock is at a depth of 39 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Temo soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is dark grayish brown gravelly coarse sand about 9 inches thick. The underlying material to a depth of 19 inches is pale brown gravelly coarse sand. Soft granite bedrock is at a depth of 19 inches.

Permeability of the Temo soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

These soils are used for woodland and wildlife habitat.

The Witefels soil is suited to the production of California red fir. Based on a site index of 60, the potential production per acre of merchantable timber is 16,700 cubic feet or 119,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the moderate hazard of erosion, steep slopes, and very low available water capacity.

The Temo soil is suited to the production of California red fir. Based on a site index of 35, the potential production per acre of merchantable timber is 9,400 cubic feet or 55,100 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the moderate hazard of erosion, very steep slopes, very low available water capacity, and shallow depth to soft bedrock.

Conventional methods of harvesting trees in areas of this complex are difficult because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting. Use of these methods is limited during November through May. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Management that minimizes the risk of erosion is essential in harvesting. Conventional methods for tree harvest cause accelerated erosion. Careful management of the understory is necessary to maintain the soil.

Areas of this complex are limited for roads because of steep and very steep slopes. Special design is needed to overcome the limitation of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIe, nonirrigated.

181—Chalco complex, 8 to 30 percent slopes. This complex is on dissected side slopes of terraces. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This complex is 50 percent Chalco very cobbly loam, 15 to 30 percent slopes, eroded, and 35 percent Chalco gravelly fine sandy loam, 8 to 15 percent slopes. The Chalco soil, 15 to 30 percent slopes, is on steeper upper parts of the terrace side slopes, and the Chalco soil, 8 to 15 percent slopes, is on less sloping toe slopes of terraces. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent outcrops of Tertiary mudstone on terrace side slopes, 2 percent Springmeyer soils on alluvial fans (range site: 26-10), 5 percent Indian Creek Variant soils on terrace tops (range site: 26-25), and 3 percent Puett soils on convex shoulders of terrace side slopes (range site: 26-29). The included soils and outcrops make up about 15 percent of mapped areas.

The Chalco soil, 15 to 30 percent slopes, eroded, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is grayish brown very cobbly loam about 1 inch thick. The subsoil and substratum are pale brown clay about 13 inches thick. Tertiary mudstone is at a depth of 14 inches.

Permeability of the Chalco soil, 15 to 30 percent slopes, eroded, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. This soil is moderately eroded. Twenty-five to 50 percent of the original surface layer has been removed by rill erosion.

The Chalco soil, 8 to 15 percent slopes, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is brown gravelly fine sandy loam about 5 inches thick. The subsoil is light brownish gray clay about 12 inches thick. Tertiary mudstone is at a depth of 17 inches.

Permeability of the Chalco soil, 8 to 15 percent slopes, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is medium and the hazards of water erosion and soil blowing are slight.

Areas of this complex are used for livestock grazing and wildlife habitat.

The potential plant community on the Chalco soil, 15 to 30 percent slopes, eroded, is mainly Wyoming big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation, very low available water capacity, and shallow depth to soft bedrock. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity, thin surface layer, and shallow depth to soft bedrock.

The potential plant community on the Chalco soil, 8 to 15 percent slopes, is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation is limited by the very low available water capacity, moderately low average annual precipitation, and shallow depth to soft bedrock. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and shallow depth to soft bedrock. Because of very low available water capacity and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good.

Loss of the surface layer results in a severe decrease in productivity of the soils and in their potential to produce plants suitable for grazing. Grazing should be delayed until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion.

Areas of this complex are limited for roads because of the moderately steep slopes, low strength, and highly expandable clay. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIe, nonirrigated. The Chalco soil, 15 to 30 percent slopes, eroded, is in range site 26-29. The Chalco soil, 8 to 15 percent slopes, is in range site 26-25.

182—Chalco-Pula association. This association is on tops and side slopes of terraces. Slope is 15 to 50 percent. Elevation is 5,500 to 6,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Chalco very gravelly loam, 15 to 30 percent slopes, and 35 percent Pula very cobbly loam, 30 to 50 percent slopes. The Chalco soil is on convex terrace tops and shoulders. The Pula soil is on lower terrace side slopes.

Included with these soils in mapping are about 5 percent Uhaldi soils on steep north-facing terrace side slopes (range site: 26-5), 2 percent Pung soils on terrace toe slopes (range site: 26-23), 3 percent Shree soils on inset alluvial fans and fan aprons at the lower terrace edges (range site: 26-10), 3 percent Haybourne loam

soils on stream terraces along drainageways (range site: 26-16), and 2 percent outcrops of Tertiary mudstone on convex terrace slopes. The included soils and outcrops make up about 15 percent of mapped areas.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface is covered with 10 to 15 percent cobbles and 50 percent pebbles. The surface layer is pale brown very gravelly loam about 5 inches thick. The subsoil is pale brown clay about 13 inches thick. Tertiary mudstone is at a depth of 18 inches.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary sediment. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly loam about 5 inches thick. The subsoil is brown extremely gravelly clay about 20 inches thick. The substratum to a depth of 60 inches is white extremely gravelly sandy loam.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Chalco soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Pula soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Because of very low available water capacity in the soils and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Chalco soil. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Chalco soil to produce vegetation suitable for grazing. Grazing should be delayed until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The use of this association for roads is limited because of moderately steep and steep slopes and the presence of highly expandable clay in the Chalco soil. Roads on the Chalco soil are difficult to maintain because of the clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Chalco soil is in capability subclass VIIe, nonirrigated, and range site 26-25. The Pula soil is in capability subclass VIIs, nonirrigated, and range site 26-10.

183—Chalco association. This association is on nearly level to moderately sloping tops and moderately steep side slopes of terraces. Slope is 2 to 30 percent. Elevation is 5,600 to 6,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This association is 70 percent Chalco gravelly fine sandy loam, 2 to 8 percent slopes, and 15 percent Chalco very cobbly loam, 15 to 30 percent slopes, eroded. The Chalco soil, 2 to 8 percent slopes, is on terrace tops, and the Chalco soil, 15 to 30 percent slopes, is on terrace breaks and side slopes.

Included with these soils in mapping are about 8 percent Greenbrae soils on fan remnants at the lower edges of the unit (range site: 26-16) and about 7 percent Haybourne loam soils on inset alluvial fans (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Chalco soil, 2 to 8 percent slopes, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray gravelly fine sandy loam about 3 inches thick. The subsoil is pale brown clay about 15 inches thick. Tertiary mudstone is at a depth of 18 inches.

Permeability of the Chalco soil, 2 to 8 percent slopes, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chalco soil, 15 to 30 percent slopes, eroded, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface

layer is light brownish gray very cobbly loam about 2 inches thick. The subsoil is pale brown clay about 9 inches thick. Tertiary mudstone is at a depth of 11 inches.

Permeability of the Chalco soil, 15 to 30 percent slopes, eroded, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. This soil is moderately eroded. Twenty-five to 50 percent of the original surface layer has been removed by rill erosion.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Chalco soil, 2 to 8 percent slopes, is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail.

The potential plant community on the Chalco soil, 15 to 30 percent slopes, eroded, is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail.

The production of vegetation suitable for livestock grazing on these soils is limited by the very low available water capacity, low average annual precipitation, and shallow depth to soft bedrock. The suitability for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity, thin surface layer, and shallow depth to soft bedrock. Because of these limitations, and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect these soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential to produce plants suitable for grazing.

Areas of this association are limited for roads because of low strength in the soil, highly expandable clay, and moderately steep slopes. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Chalco soil, 2 to 8 percent slopes, is in capability subclass VIIs, nonirrigated, and range site 26-25. The Chalco soil, 15 to 30 percent slopes, eroded, is in capability subclass VIIe, nonirrigated, and range site 26-29.

191—Cradlebaugh clay loam, drained, slightly saline-alkali. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from granite, gneiss, slate, andesite, basalt, and volcanic ash. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 110 days.

Typically, the surface layer is gray clay loam that grades to sandy clay loam. It is about 17 inches thick. The upper 22 inches of the underlying material is stratified, light gray and grayish brown fine sandy loam, silty clay loam, and sandy clay loam. It is weakly silica-cemented in parts. Below this to a depth of 60 inches, the underlying material is light olive gray fine sandy loam. In some areas the surface layer is clay.

Included with this soil in mapping are small areas of soil that are saline-alkali free.

Permeability of this Cradlebaugh soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 4 feet from February through May. The degree of drainage changed as the water table dropped because of changes in the original course of streams or as channel entrenchment occurred. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March. It is slightly saline and alkaline throughout.

Areas of this soil are used for irrigated hay and pasture and wildlife habitat. Some areas are used for urban development.

This Cradlebaugh soil is well suited to irrigated hay and pasture and to small grains. The main limitations are occasional flooding, the seasonal high water table, and a slightly saline-alkali surface layer. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow water infiltration. Use of nitrogen fertilizer promotes good growth of forage plants. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leveling helps to insure the uniform application of water. Because of depth to the water table, cuts required for leveling should be less than 12 inches.

Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Because of the moderately slow pemeability of this soil, the rate of application should be adjusted to permit adequate infiltration of water. Water should be applied at a slow rate over a long period to insure that the root zone is properly wetted. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali. The content of salts and alkali can be reduced by using soil amendments such as gypsum, by leaching, and by carefully applying irrigation water.

The main limitations for urban development are occasional flooding, the seasonal high water table, and moderately slow permeability. Buildings should be located above the expected flood level. Flooding can be controlled by use of major flood control structures. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability.

This Cradlebaugh soil is limited for roads because of low strength, occasional flooding, and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flash flooding are difficult to establish and maintain. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

192—Cradlebaugh clay loam, drained, strongly saline-alkali. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from granite, gneiss, slate, andesite, basalt, and volcanic ash. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 110 days.

Typically, the surface layer is gray clay loam about 9 inches thick. The upper 22 inches of the underlying material is stratified, light gray silty clay loam, clay loam, and fine sandy loam. It is weakly silica-cemented in parts. Below this to a depth of 60 inches, the underlying material is grayish brown fine sandy loam.

Included with this soil in mapping are small areas of Cradlebaugh soils in which the surface layer is leached of salt and alkali.

Permeability of this Cradlebaugh soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 4 feet from February through May. The degree of drainage changed as the water table dropped because of changes in the original course of streams or as channel entrenchment occurred. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March. It is strongly affected by salt and alkali in the surface layer and is moderately affected below this layer.

Areas of this soil are used for irrigated hay and pasture, urban development, and wildlife habitat.

This Cradlebaugh soil is suited to irrigated hay and pasture. The main limitations are the strongly saline-alkali condition in the surface layer and occasional flooding. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table and lack of suitable drainage outlets. Proper irrigation water management can reduce the concentration of salts. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Irrigation water can be applied by the border and corrugation methods. Leveling helps to insure the uniform application of water. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are occasional flooding, the deep seasonal high water table, and moderately slow permeability. Buildings should be located above the expected flood level. Flooding can be controlled by use of major flood control structures. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability.

Areas of this Cradlebaugh soil are limited for roads because of low strength, occasional flooding, and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. To establish and maintain structures to protect the soil from flash flooding is difficult. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIw, irrigated.

193—Cradlebaugh clay loam, slightly saline-alkali. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from granite, gneiss, slate, andesite, basalt, and volcanic ash. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 17 inches thick. The upper 30 inches of the underlying material is stratified, light grayish brown and grayish brown silty clay loam, clay loam, and fine sandy loam. It is weakly silica-cemented in parts. Below this to a depth of 60 inches, the underlying material is light olive gray fine sandy loam.

Included with this soil in mapping are small areas of soils that are saline-alkali free.

Permeability of this Cradlebaugh soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from February through June. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief

flooding in December through March. It is slightly saline and alkaline throughout.

Areas of this soil are used for irrigated hay and pasture, wildlife habitat, and urban development.

This Cradlebaugh soil is suited to hay and pasture. The main limitations are the slightly saline-alkali condition in the surface layer, the moderately deep seasonal high water table, and occasional flooding. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Flooding can be controlled by major flood structures. Salt-tolerant species are more suitable for planting than most other species. Irrigation water can be applied by the border and the corrugation methods. Leveling helps to insure the uniform application of water. Because of the high water table, cuts required for leveling should be less than 6 inches deep. Surface drains can be used to maintain the water table at its present level, to reduce the length of ponding, and to inhibit the growth of less palatable water-tolerant plants. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated hay and pasture.

The main limitations for urban development are the moderately deep seasonal high water table, occasional flooding, and moderately slow permeability. Flooding can be controlled by use of major flood control structures. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability.

This Cradlebaugh soil is limited for roads because of low strength, occasional flooding, and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flash flooding are difficult to establish and maintain. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIIw, irrigated.

194—Cradlebaugh clay loam, strongly saline-alkali. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from granite, gneiss, slate, andesite, basalt, and volcanic ash. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 9 inches thick. The upper 22 inches of the underlying material is stratified, light gray and grayish brown sandy clay loam, fine sandy loam, and silt loam. It is weakly silica-cemented in some parts. Below this to a depth of 60 inches, the underlying material is light olive gray fine sandy loam.

Included with this soil in mapping are small areas of soils that are slightly affected by salts and alkali.

Permeability of this Cradlebaugh soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from February through June. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding from December through March. It is strongly affected by salt and alkali in the surface layer and moderately affected below this layer.

Areas of this soil are used for irrigated hay and pasture, urban development, and wildlife habitat.

The main limitations for hay and pasture are the strongly saline and alkali condition in the surface layer, a seasonal high water table, and occasional flooding. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Flooding can be controlled by use of major flood control structures.

The main limitations for urban development are occasional flooding, a moderately deep seasonal high water table, and moderately slow permeability. Flooding can be controlled by the use of major flood control structures. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and moderately slow permeability.

Areas of this Cradlebaugh soil are limited for roads because of low strength in the soil, occasional flooding, and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flash flooding are difficult to establish and maintain. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIw, irrigated.

201—Dangberg silt loam, drained, strongly saline-alkali. This moderately deep, poorly drained soil is on terraces. The drainage has been altered. This soil formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the

average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray silt loam about 6 inches thick. The subsoil is light brownish gray clay about 18 inches thick. The upper 7 inches of the substratum is a strongly silica-cemented hardpan, and the lower part to a depth of 60 inches is pale brown sandy loam. Some areas have slopes of 2 to 4 percent.

Included with this soil in mapping is about 10 percent Brockliss Variant soils, drained, on alluvial fans (range site: 26-30).

Permeability of this Dangberg soil is very slow. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 24 to 33 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is strongly affected by salt and alkali above the hardpan.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the high concentrations of salt and alkali, moderately low average annual precipitation, and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the high content of salt and alkali in the surface layer. Management of the unit is mainly for the included soils. Cattle generally avoid areas of this soil unless their movement is restricted by fences. Because of moderately low average annual precipitation and the competition from greasewood and sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This Dangberg soil is limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-12.

202—Dangberg clay, slightly saline-alkali. This moderately deep, poorly drained soil is on alluvial terraces. It formed in alluvium derived dominantly from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 3 inches thick. The subsoil is light brownish gray clay and sandy clay about 22 inches thick. Below this is a light brownish gray, strongly silica-cemented hardpan about 18 inches thick. The substratum to a depth of 60 inches or more is pale brown coarse sand. In some areas the surface layer is clay loam.

Included with this soil in mapping are small areas of soils that are strongly affected by salts and alkali.

Permeability of this Dangberg soil is very slow. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 24 to 36 inches in December through May and by a hardpan at a depth of 24 to 33 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

This soil is slightly affected by salt and alkali in the surface layer and moderately affected between the surface layer and the top of the hardpan. This soil is subject to rare flooding. Water is perched above the hardpan during the periods of irrigation. Ground water is held under artesian pressure below the hardpan.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat. Some areas are used for urban development.

This Dangberg soil is suited to irrigated hay and pasture. The main limitations are the moderately deep seasonal high water table and very slow permeability. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the moderately deep seasonal high water table, slow water infiltration, and very slow permeability. Salt-tolerant species are more suitable for planting than most other species. Irrigation water must be applied carefully to prevent a rise of the perched water table. Border and corrugation irrigation methods are suited to this soil. These methods permit even, controlled application of water and reduce runoff. Leveling is needed in most areas for the efficient application and removal of irrigation water. Because of the limited depth to the water table and hardpan, cuts required for leveling should be less than 6 inches deep.

The main limitations for urban development are highly expandable clay, moderate depth to the seasonal high water table, very slow permeability, and rare flooding. The hardpan is rippable. To establish and maintain structures to protect this soil from flash flooding is difficult. Septic tank absorption fields do not function properly because of wetness and the very slow permeability. Buildings should be designed to offset the limited ability of this soil to support a load and to offset the effects of shrinking and swelling.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult

to maintain because of the clay, which has low strength when wet. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IVw, irrigated.

203—Dangberg clay, strongly saline-alkali. This moderately deep, poorly drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 3 inches thick. The subsoil is light brownish gray clay about 22 inches thick. Below this is a strongly silica-cemented hardpan about 18 inches thick. The substratum to a depth of 60 inches or more is pale brown coarse sand. In some areas, the surface layer is clay loam.

Included with this soil in mapping is about 5 percent Brockliss Variant soils, drained, on inset alluvial fans (range site: 26-30).

Permeability of this Dangberg soil is very slow. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 24 to 36 inches in December through May and by a hardpan at a depth of 24 to 33 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight. Ground water is held under artesian pressure below the hardpan. This soil is subject to rare flooding. During the irrigation period, ground water is perched above the hardpan. This soil is strongly affected by salt and alkali in the surface layer and moderately affected below this layer and above the hardpan.

Areas of this soil are used for irrigated pasture and wildlife habitat. Some areas are used for urban development.

The main limitations of this soil for pasture are the strongly saline-alkali condition in the surface layer, a moderately deep seasonal high water table, and slow permeability. The concentration of salts and alkali in the surface layer limits the production of plants suitable for pasture. Leaching the salts from the surface layer is limited by the high water table, slow water infiltration, and very slow permeability. Salt-tolerant species are more suitable for planting than most other species. Irrigation water must be applied carefully to prevent a rise of the perched water table, and surface drainage may be required. Border and corrugation irrigation methods are suited to this soil. These methods permit the even controlled application of water, reduce runoff, and minimize the risk of erosion. Leveling is needed in most areas for the efficient application and removal of irrigation water. Because of the limited depth to the hardpan, cuts required for leveling should be less than 6 inches deep.

The main limitations for urban development are the highly expandable clay, moderate depth to the seasonal high water table, very slow permeability, and rare flooding. The hardpan is rippable. To establish and maintain structures to protect this soil from flash flooding is difficult. Septic tank absorption fields do not function properly because of wetness and the very slow permeability. Buildings should be designed to offset the limited ability of this soil to support a load and to offset the effects of shrinking and swelling.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIw, irrigated. It is in range site 26-13.

204—Dangberg clay, wet. This moderately deep, poorly drained soil is in depressions on alluvial terraces. Drainage has been altered. This soil formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 3 inches thick. The subsoil is light brownish gray clay about 22 inches thick. Below this is a light brownish gray, strongly silica-cemented hardpan about 18 inches thick. The substratum to a depth of 60 inches or more is pale brown coarse sand.

Included with this soil in mapping is about 5 percent Dangberg soils that are drained.

Permeability of this Dangberg soil is very slow. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 12 to 24 inches from December through May and by a hardpan at a depth of 24 to 33 inches. Runoff is slow, and the hazards of water erosion and of soil blowing are slight. Ground water is held under artesian pressure below the hardpan. Water is perched above the hardpan during the irrigation season. The soil is subject to occasional, brief flooding from December through March. It is slightly affected by salt and alkali in the surface layer and moderately affected between this layer and the top of the hardpan.

Areas of this soil are used for irrigated pasture and wildlife habitat.

The main limitations for pasture are the shallow seasonal high water table and very slow permeability. The concentration of salts and alkali in the surface layer and the shallow water table limit the production of plants suitable for pasture. Leaching the salts from the surface layer is limited by the shallow seasonal high water table, slow infiltration, and very slow permeability. Salt-tolerant species are more suitable for planting than most other species. Border and corrugation irrigation methods are suited to this soil. Irrigation water must be applied carefully to prevent a rise of the perched water table, and surface drainage may be required. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and a low infiltration rate. The use of equipment is limited by wetness. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

Areas of this soil are limited for roads because of the occasional flooding and highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Structures to protect this soil from flash flooding are difficult to maintain. Trafficability of roads can be improved by a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIw, irrigated.

205—Dangberg clay, wet, strongly alkali. This moderately deep, poorly drained soil is in depressions on alluvial terraces. Drainage has been altered. This soil formed in alluvium derived dominantly from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 3 inches thick. The subsoil is light brownish gray clay about 22 inches thick. Below this is a light brownish gray, strongly silica-cemented hardpan about 18 inches thick. The substratum to a depth of 60 inches or more is pale brown coarse sand.

Included with this soil in mapping are small areas of Dangberg soils in which the surface layer is leached and free of alkali.

Permeability of this Dangberg soil is very slow. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 12 to 24 inches from December through May and by a hardpan at a depth of 24 to 33 inches. Runoff is ponded, and the hazards of water erosion and soil blowing are slight. This soil is strongly affected by alkali in the surface layer and moderately affected between this layer and the top of the hardpan.

Ground water is held under artesian pressure below the hardpan. Water is perched above the hardpan during the irrigation season. This soil is subject to occasional, brief flooding from December through March.

Areas of this soil are used for irrigated pasture and wildlife habitat.

The main limitations for irrigated pasture are the shallow seasonal high water table, a strongly alkali affected surface layer, and very slow permeability. The concentration of alkali in the surface layer and the shallow water table limit the production of plants suitable for pasture. Leaching the alkali from the surface layer is limited by the seasonal high water table, slow infiltration, very slow permeability, and lack of grade to a drainage outlet. Salt-tolerant species are more suitable for planting than most other species. Border and corrugation irrigation methods are suited to this soil. Irrigation water must be applied carefully to prevent a rise in the perched water table. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration rate. The use of equipment is limited by wetness. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

Areas of this soil are limited for roads because of occasional flooding and the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Structures to protect this soil from flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIw, irrigated. It is in range site 26-13.

211—Devada-Drit-Roloc association. This association is on slopes of mountains. Slope is 15 to 75 percent. Elevation is 6,500 to 7,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 55 percent Devada very cobbly loam, 15 to 30 percent slopes, 20 percent Drit very stony sandy loam, 50 to 75 percent slopes, and 15 percent Roloc extremely stony sandy loam, 30 to 50 percent slopes. The Devada soil is on south-facing side slopes, the Drit soil is on north-facing side slopes, and the Roloc soil is on ridges and adjacent to outcrops of rock.

Included with these soils in mapping are about 3 percent Rock outcrop on ridges and 7 percent Shree soils on north-facing toe slopes (range site: 26-10). The included soils and Rock outcrop make up about 10 percent of mapped areas.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from igneous rock. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly loam about 4 inches thick. The subsoil is dark brown clay about 9 inches thick. Hard bedrock is at a depth of 13 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony sandy loam about 15 inches thick. The underlying material to a depth of 60 inches is light yellowish brown very gravelly coarse sandy loam.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 15 to 30 percent stones. The surface layer is grayish brown extremely stony sandy loam about 11 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 7 inches thick. Below this is weathered bedrock.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of these soils are used for livestock grazing and wildlife habitat.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is extremely steep slopes.

The potential plant community on the Roloc soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in less sloping areas of the Devada soil. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Devada and Roloc soils to produce vegetation suitable for grazing. Because of the density of pinyon and juniper in most areas, these areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of these soils are limited for roads because of the moderately steep to very steep slopes, low strength of the soil, and shallow depth to hard bedrock in the Devada soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Devada soil. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Devada soil is in capability subclass VIIe, nonirrigated, and range site 26-23. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-46.

212—Devada-Koontz association. This association is on mountain slopes and ridges. Slope is 15 to 30 percent. Elevation is 5,200 to 6,500 feet. The average precipitation is about 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Devada very cobbly loam, 15 to 30 percent slopes, and 25 percent Koontz cobbly loam, 15 to 30 percent slopes. The Devada soil is on mountain side slopes, and the Koontz soil is on mountain ridges and shoulders.

Included with these soils in mapping are about 3 percent Loomer soils on south-facing side slopes (range

site: 26-25), 6 percent Shree soils on foot slopes (rangesite: 26-10), 3 percent Greenbrae soils on toe slopes (range site: 26-16), and 3 percent Stodick soils interspersed with Koontz soils (range site: 26-25). The included soils make up 15 percent of mapped areas.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly loam about 4 inches thick. The subsoil is dark brown gravelly clay about 9 inches thick. Rhyolite bedrock is at a depth of 13 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Koontz soil is shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface is covered with 5 to 15 percent cobbles. The surface layer is grayish brown cobbly loam about 7 inches thick. The subsoil is yellowish brown very gravelly clay loam about 7 inches thick. Weathered metavolcanic rock is at a depth of 14 inches.

Permeability of the Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Koontz soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for grazing is limited by the moderately low average annual precipitation and very low available water capacity. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

Grazing in areas of this association should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Livestock grazing should be managed to prevent overgrazing in the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of the moderately steep slopes, low strength in the soil, and shallow depth to hard bedrock in the Devada soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Devada soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by a stable base and an adequate wearing surface.

The Devada soil is in capability subclass VIIe, nonirrigated, and range site 26-23. The Koontz soil is in capability subclass VIIe, nonirrigated, and range site 26-15.

213—Devada-Burnborough Variant association. This association is on pediments and side slopes of mountains. Slope is 8 to 30 percent. Elevation is 7,000 to 7,200 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 45 degrees F., and the average frost-free period is about 85 days.

This association is 50 percent Devada extremely stony loam, 8 to 15 percent slopes, and 35 percent Burnborough Variant stony loam, 15 to 30 percent slopes. The Devada soil is on dissected pediments, and the Burnborough Variant soil is on north-facing side slopes below the pediments.

Included with these soils in mapping are about 8 percent Duco soils on ridges (woodland site: Pinyon-juniper woodland), 5 percent Pung soils on toe slopes below the Burnborough Variant soil (range site: 26-23), and 2 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 4 inches thick. The subsoil is dark brown clay about 12 inches thick. Andesitic bedrock is at a depth of 16 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to hard bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Burnborough Variant soil is moderately deep and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is dark grayish brown stony loam about 15 inches thick. The subsoil is brown gravelly loam and gravelly clay loam about 25 inches thick. Soft bedrock is at a depth of 40 inches.

Permeability of the Burnborough Variant soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, Sandberg bluegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squireltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and extremely stony surface.

The potential plant community on the Burnborough Variant soil is mainly antelope bitterbrush, mountain big sagebrush, western needlegrass, and Columbia needlegrass. The present vegetation in most areas is mainly antelope bitterbrush, mountain big sagebrush, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately steep slopes. Seeding large areas of the Burnborough Variant soil is difficult. This is because of the pattern in which this soil occurs with the Devada soils. Cold soil temperatures limit plant growth on the Burnborough Variant soil. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Livestock grazing should be managed to protect the soils in this association from excessive erosion.

Areas of this association are limited for roads because of low strength of the soil, shallow depth to bedrock in the Devada soil, and the moderately steep slopes on the Burnborough Variant soil. Because of the underlying hard bedrock, deep cuts should be avoided, especially on the Devada soil. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Devada soil is in capability subclass VIIe, nonirrigated, and range site 26-23. The Burnborough Variant soil is in capability subclass VIe, nonirrigated, and range site 26-40.

214—Devada-Rock outcrop association. This association is on rolling foothills. Slope is 15 to 50 percent. Elevation is 5,700 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 70 percent Devada very cobbly loam, 15 to 50 percent slopes, and 15 percent Rock outcrop. The Devada soil is on side slopes and ridges. Rock outcrop is on ridges and peaks.

Included with this association in mapping are about 5 percent deep Pung soils on moderately steep concave slopes (range site: 26-23), 5 percent deep Cassiro soils on steep concave north-facing slopes (range site: 26-10), 2 percent Olac soils on ridges (range site: 26-16), 2 percent Loomer soils on south-facing slopes (range site: 26-25), and 1 percent Rubble land on very steep south-facing slopes. Also included are small areas of moderately sloping and strongly sloping Deven soils adjacent to the Carson City area. The included soils and Rubble land make up about 15 percent of mapped areas.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly loam about 4 inches thick. The subsoil is dark brown clay about 12 inches thick. Andesite is at a depth of 16 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed andesitic rock and less than 10 percent soil material.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes.

The use of machinery in range management is not practical, because the surface is very cobbly and the slopes are steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access and movement by

livestock and results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the soils from excessive erosion.

Areas of this association are limited for roads because of the outcrops of rock, moderately steep and steep slopes, the shallow depth to hard bedrock, and low strength in the Devada soil. Special design is needed to overcome the depth to hard bedrock and moderately steep and steep slopes. Trafficability can be improved by providing roads with a stable base and an adequate wearing surface. Because of the shallow depth to bedrock, deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Devada soil is in capability subclass VIIe, nonirrigated, and range site 26-23. Rock outcrop is in capability subclass VIIIs, nonirrigated.

221—East Fork Variant loam. This very deep, somewhat poorly drained soil is on alluvial terraces. It formed in alluvium derived from granite and various igneous and sedimentary rocks. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free season is about 100 days.

Typically, the surface layer is grayish brown loam about 38 inches thick. The upper 10 inches of the underlying material is brown fine sandy loam, and the lower part to a depth of 60 inches is brown very gravelly sand. The surface layer is sandy in some areas.

Included with this soil in mapping are small areas of East Fork soils on inset fans that are subject to occasional flooding.

Permeability of this East Fork Variant soil is moderate. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December to June. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for irrigated crops.

This soil is suited to hay and pasture. It has few limitations. Grasses and legumes grow well if adequate fertilizer is used. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff.

This East Fork Variant soil is well suited to irrigated crops. It has few limitations. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally depends on the crop. Leveling helps to insure the uniform application of water. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Crop residue left on or near the surface helps to conserve moisture and maintain tilth. Crops respond to nitrogen and phosphorous fertilizers.

Areas of this soil are moderately limited for roads because of the low strength of the soil, rare flooding, and moderate frost heaving. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

231—Brockliss Variant-Dangberg association. This association is on alluvial fans and terraces. Slope is 0 to 8 percent. Elevation is 5,200 to 5,400 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 35 percent Brockliss Variant very gravelly loam, drained, 4 to 8 percent slopes, 30 percent Brockliss Variant very gravelly sandy loam, 4 to 8 percent slopes, and 20 percent Dangberg loam, drained, 0 to 2 percent slopes. The Brockliss Variant very gravelly loam, drained, soil is on the lower part of the alluvial fans, the Brockliss Variant very gravelly sandy loam soil is on the upper part of the alluvial fans bordering the mountain front, and the Dangberg soil is on stream terraces below the alluvial fans.

Included with these soils in mapping are about 7 percent Jubilee soils on flood plains in drainageways and adjacent to the lower edges of the unit (range site: 26-1) and 8 percent Fettic strongly saline soils on the edges of flood plains and elevated areas within the flood plain (range site: 26-13). The included soils make up about 15 percent of mapped areas.

The Brockliss Variant, drained, soil is very deep. The degree of natural drainage improved as the level of the water table dropped because of changes in the original flow of springs. This soil formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown and dark grayish brown very gravelly loam about 6 inches thick. The underlying material to a depth of 60 inches is brown, stratified extremely gravelly loam and very gravelly fine sandy loam.

Permeability of the Brockliss Variant, drained, soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. A seasonal high water table is at a depth of 5 to 6 feet in March through June. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Brockliss Variant soil is very deep and somewhat poorly drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown very gravelly sandy loam about 6 inches thick. The underlying material to a depth of 60 inches is grayish brown, stratified very gravelly loam and extremely gravelly sandy loam.

Permeability of the Brockliss Variant soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. A seasonal high water table is at a depth of 3.5 to 5 feet in March through June. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Dangberg, drained, soil is moderately deep. The present degree of drainage resulted when the water table dropped because of changes in the original flow of springs. This soil formed in alluvium derived from mixed sources of rock. Typically, the surface layer is light grayish brown loam about 6 inches thick. The subsoil is pale brown clay loam about 18 inches thick. A strongly cemented hardpan about 7 inches thick is at a depth of 24 inches. The substratum to a depth of 60 inches is pale brown sandy loam.

Permeability of this Dangberg, drained, soil is very slow. Available water capacity is moderate. Effective rooting depth coincides with depth to the hardpan. The depth is 24 to 33 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is slightly affected by salt and alkali in the surface layer and strongly affected between this layer and the top of the hardpan.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Brockliss Variant, drained, soil is mainly basin big sagebrush, basin wildrye, and Nevada bluegrass. The present vegetation in most areas is mainly basin big sagebrush and basin wildrye. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and the low available water capacity. This soil produces more vegetation than is common because it is in drainageways that receive additional moisture from nearby areas. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the low available water capacity of the surface layer and the moderately low average annual precipitation.

The potential plant community on the Brockliss Variant soil is mainly tufted hairgrass, Nevada bluegrass, and meadow barley. The present vegetation in most areas is mainly iris, wooly wyethia, and Nevada bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the low available water capacity of the surface layer and the moderately low average annual precipitation.

The potential plant community on the Dangberg, drained, soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, basin wildrye, and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the strongly saline and alkali subsoil, moderate available water capacity, and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are moderately low average annual precipitation and an abrupt textural boundary at a very shallow depth.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazng pressure.

Areas of this association are limited for roads because of the moderate frost heave, because of the highly expandable clay and low strength in the Dangberg soil, and because of the rare flooding in the Brockliss Variant soil. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Structures to protect the Brockliss Variant soil from flash flooding are difficult to establish and maintain. Roads should be provided with adequate surface drainage.

The Brockliss Variant, drained, soil is in capability subclass VIw, nonirrigated, and range site 26-30. The Brockliss Variant soil is in capability subclass VIIw, nonirrigated, and range site 26-3. The Dangberg soil is in capability subclass VIIs, nonirrigated, and range site 26-12.

241—Dressler coarse sandy loam. This very deep, somewhat poorly drained soil is on alluvial terraces and fans. It formed in alluvium derived dominantly from granite and other igneous rock. Slope is 0 to 2 percent. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark grayish brown coarse sandy loam about 20 inches thick. The upper 17 inches of the underlying material is yellowish brown loamy coarse sand, and the lower part to a depth of 60 inches is pale brown, brown, and strong brown, stratified cobbly coarse sandy loam and loamy sand.

Included with this soil in mapping are small areas of soils in which the water table is near the surface for short periods early in summer. Also included are areas that have a gravelly surface layer. The included soils make up about 10 percent of mapped areas.

Permeability of this Dressler soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff

is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional brief flooding in December through March. Ground water moves laterally through the lower part of the underlying material.

Areas of this soil are used for irrigated hay, pasture, cropland, urban development, and wildlife habitat.

This soil is suited to hay and pasture. The main limitations are the moderate available water capacity and occasional flooding. Because this soil is droughty, light and frequent applications of irrigation water are needed. Grasses and legumes grow well if adequate fertilizer is used. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Leveling of the surface helps to insure the uniform application of water.

This Dressler soil is suited to irrigated crops. It is limited mainly by the moderate available water capacity and occasional flooding. Deep-rooted crops are suited to areas that have adequate drainage. Tile drainage can be used to lower the water table if a suitable outlet is available. Furrow, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling is needed for the efficient application of irrigation water. Because of the limited depth to the seasonal high water table, cuts required for leveling should be less than 12 inches deep. Crop residue left on or near the surface helps to conserve moisture and maintain tilth. Tillage should be kept to a minimum.

The main limitations for urban development are the occasional flooding, a seasonal high water table, and unstable sidewalls in cutbanks. Drainage helps to reduce the wetness. Buildings need to be located above the expected flood level. Flooding can be controlled by use of major flood control structures. Septic tank absorption fields do not function properly because of wetness.

Areas of this soil are limited for roads because of the occasional flooding and severe frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

242—Dressler sandy loam, wet. This very deep, somewhat poorly drained soil is on alluvial fans and terraces. The drainage has been altered. This soil formed in alluvium derived dominantly from granite and other igneous rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with a mat of fibrous roots about 4 inches thick. The surface layer is dark grayish brown sandy loam about 20 inches thick. The upper 17 inches of the underlying material is yellowish brown loamy coarse sand, and the lower part to a depth of 60 inches is strong brown, stratified cobbly coarse sandy loam and sand. Some small areas south of Centerville have a gravelly sandy loam surface.

Included with this soil in mapping are small areas of a soil that has a seasonal high water table at a depth of 3 to 4 feet. The included soil makes up about 10 percent of mapped areas.

Permeability of this Dressler soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through May. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March.

Areas of this soil are used for irrigated hay, pasture, cropland, urban development, and wildlife habitat.

Areas of this soil are suited to hay and pasture. The main limitations are the moderately deep seasonal high water table and moderate available water capacity. Grasses and legumes grow well if adequate fertilizer is used. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Wetness limits the choice of plants, limits the period of harvesting or grazing, and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Irrigation water can be applied by the furrow and corrugation methods. Irrigation water must be carefully applied to avoid raising the water table. Leveling of the surface helps to insure the uniform application of water.

This Dressler soil is suited to shallow-rooted crops. It is limited mainly by the moderately deep seasonal high water table and moderate available water capacity. Most climatically adapted crops can be grown if artificial drainage is provided. Drainage can be provided by using tile systems to intercept water from higher lying areas. Furrow, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Because this soil is droughty, light and frequent applications of irrigation water are needed. The rate of application of irrigation water needs to be regulated to prevent a rise in the level of the water table. Tillage should be kept to a minimum. Tilth and fertility can be improved by returning crop residue to the soil.

The main limitations for urban development are the moderately deep seasonal high water table, unstable sidewalls in cutbanks, and occasional flooding. Buildings

should be located above the expected flood level. Drainage is needed if buildings with basements and crawl spaces are constructed. Drainage can be provided by using tile systems to intercept water from high lying areas. Septic tank absorption fields do not function properly because of wetness.

Areas of this soil are limited for roads because of the occasional flooding and severe frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

251—Duco-Cagle-Nosrac association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 5,400 to 6,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 40 percent Duco extremely stony loam, 15 to 30 percent slopes, 30 percent Cagle extremely stony loam, 15 to 30 percent slopes, and 15 percent Nosrac very stony loam, 30 to 50 percent slopes. The Duco soil is on ridges and shoulders, the Cagle soil is on slightly convex south- and west-facing side slopes and toe slopes, and the Nosrac soil is on north-facing slightly concave side slopes.

Included with these soils in mapping are about 5 percent Springmeyer soils on alluvial fans and drainageways in narrow valleys (range site: 26-10), 5 percent Deven soils on ridges (woodland site: Pinyon-juniper woodland), and 5 percent Rock outcrop on ridges and spurs. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 5 inches thick. The upper 5 inches of the subsoil is dark grayish brown gravelly loam, and the lower 9 inches is brown very gravelly clay loam. Hard andesite bedrock is at a depth of 19 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 3 inches thick. The upper 28 inches of the subsoil is brown gravelly clay, and the lower 7 inches is light brownish gray very cobbly clay loam. Weathered andesite bedrock is at a depth of 38 inches.

Permeability of the Cagle soil is slow. Available water capacity low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 8 inches thick. The upper 25 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is olive very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Duco and Cagle soils are suited to the production of singleleaf pinyon and Utah juniper. They can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very stony and extremely stony surface and severe plant competition for moisture on the Duco soils. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting trees can be used. Minimizing the risk of erosion is essential in harvesting. Because the subsoil of the Cagle soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity of the Duco soil generally influences seedling survival in areas where understory plants are numerous.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low amount of precipitation in summer and the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, these areas can be

managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of the moderately steep and steep slopes, the shallow depth to bedrock and the large stones on the Duco soil, and the highly expandable clay in the Cagle soil. Stones and cobbles on the surface make the construction of roads difficult. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Trafficability of roads on the Cagle soil can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Duco soil is in capability subclass VIIe, nonirrigated. The Cagle soil is in capability subclass VIIs, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

252—Duco-Devada-Nosrac association. This association is on slopes of mountains. Slope is 8 to 50 percent. Elevation is 5,800 to 7,200 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Duco stony loam, 30 to 50 percent slopes, 25 percent Devada very stony loam, 8 to 15 percent slopes, and 15 percent Nosrac stony fine sandy loam, 30 to 50 percent slopes. The Duco soil is on convex side slopes, the Devada soil is on broadly convex ridges and saddles, and the Nosrac soil is on concave north- and east-facing side slopes.

Included with these soils in mapping are about 3 percent Rock outcrop on ridges, 5 percent Cassiro soils on toe slopes (range site: 26-10), 3 percent moderately deep, clayey Cagle soils on convex south- and west-facing side slopes (woodland site: Pinyon-juniper woodland), 2 percent Shree soils on alluvial fans at the base of slopes (range site: 26-10), 1 percent Brockliss Variant soils in drainageways (range site: 26-3), and 1 percent Brockliss Variant soils, drained, along edges of drainageways (range site: 26-30). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from metasedimentary rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 3 inches thick. The subsoil is brown very gravelly clay loam about 7 inches thick. Hard metasedimentary bedrock is at a depth of 10 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 3 inches thick. The subsoil is brown clay about 10 inches thick. Hard andesite bedrock is at a depth of 13 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from metasedimentary rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony fine sandy loam about 9 inches thick. The upper 22 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is pale brown very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in harvesting trees are the very steep slopes, severe hazard of erosion, and stony surface. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Management that minimizes the risk of erosion is essential in harvesting trees.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Sandberg bluegrass with invasion of singleleaf pinyon and juniper. The production of vegetation is limited by the low available water capacity and the low precipitation during the growing season. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the surface stones and low available water capacity.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western

needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and the low precipitation in summer. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is slope.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Devada soil. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the Devada and Nosrac soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes on the Duco and Nosrac soils, shallow depth to bedrock on the Duco and Devada soils, and low strength in the Devada soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco and Devada soils. Roads on the Devada soil are difficult to maintain because of the presence of clay, which has low strength when wet. Trafficability of roads on the Devada soil can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Duco soil is in capability subclass VIIe, nonirrigated. The Devada soil is in capability subclass VIIs, nonirrigated, and in range site 26-23. The Nosrac soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

253—Duco-Nosrac association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 6,400 to 7,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 90 days.

This association is 45 percent Duco very cobbly fine sandy loam, 15 to 50 percent slopes, and 40 percent Nosrac very stony loam, 30 to 50 percent slopes. The Duco soil is on south- and west-facing convex side slopes and ridges, and the Nosrac soil is on concave north-facing slopes. Adjacent to the Lyon County Area, this association has 55 percent Duco soils and 30 percent Nosrac soils.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and side slopes, 3 percent Cagle soils on convex north-facing slopes (woodland site: Pinyon-juniper woodland), 2 percent Koontz soils on south-facing toe slopes (range site: 26-15), 3 percent Springmeyer soils on alluvial fans in narrow valleys (range site: 26-10), and 2 percent Cassiro soils on concave north-facing toe slopes (range site: 26-10). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 10 to 20 percent cobbles. The surface layer is grayish brown very cobbly fine sandy loam about 5 inches thick. The subsoil is dark grayish brown very gravelly clay loam about 10 inches thick. Andesite bedrock is at a depth of 15 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 10 inches thick. The upper 22 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is pale brown very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are steep slopes, severe hazard of erosion, and very low available water capacity. Maintaining the understory vegetation is essential for the control of erosion. Recently burned-over or harvested areas can be grazed until competition from trees eliminates the grazable forage. The young trees can be cut for use as Christmas trees. Plant competition and very low available water capacity delay natural regeneration but do not prevent the eventual development of a fully stocked normal stand of trees. Conventional methods of harvesting trees are difficult to use because of slope.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by low precipitation in summer and moderate available water capacity. The

suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes and because of the shallow depth to bedrock and the very cobbly surface of the Duco soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Unless an adequate wearing surface is maintained, stones and cobbles are road hazards and result in increased maintenance cost. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Duco soil is in capability subclass VIIe, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

254—Duco-Nosrac-Burnborough Variant association. This association is on slopes and pediments of mountains. Slope is 4 to 50 percent. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 85 days.

This association is 45 percent Duco stony loam, 15 to 50 percent slopes, 25 percent Nosrac very stony loam, 30 to 50 percent slopes, and 15 percent Burnborough Variant stony loam, 4 to 15 percent slopes. The Duco soil is on south-facing side slopes below the pediments, the Nosrac soil is on north-facing side slopes below the pediments, and the Burnborough Variant soil is on pediments.

Included with these soils in mapping are about 4 percent Shree soils on alluvial fans at slope bases on the lower edge of the unit (range site: 26-10), 4 percent Burnborough soils on colder sites of concave north-facing slopes (range site: 26-5), 3 percent deep Cagle soils on south-facing slopes (woodland site: Pinyon-juniper woodland), 1 percent loamy-skeletal mixed, frigid Aridic Haploxerolls on cold moist sites on north-facing slopes (woodland site: Ponderosa pine woodland), 1 percent Brockliss Variant soils in small narrow valleys (range site: 26-3), 1 percent Brockliss Variant soils, drained, on entrenched drainageways (range site: 26-30), and 1 percent Rock outcrop on side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is dark grayish brown stony loam about 4 inches thick. The upper 4 inches of the subsoil is dark gray gravelly loam, and the lower 9 inches is brown very gravelly clay loam. Andesitic bedrock is at a depth of 17 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is dark gray very stony loam about 10 inches thick. The upper 14 inches of the subsoil is brown very gravelly clay loam, and the lower 9 inches is yellowish brown very gravelly clay loam. The substratum is yellowish brown very gravelly clay loam to a depth of 60 inches.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Burnborough Variant soil is moderately deep and well drained. It formed in residuum derived dominantly from andesitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 15 inches thick. The subsoil is brownish gray gravelly clay loam about 15 inches thick. The substratum to a depth of 33 inches is brown gravelly loam. Soft andesite bedrock is at a depth of 33 inches.

Permeability of the Burnborough Variant soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing, woodland, and wildlife habitat.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are very low available water capacity, steep slopes, and high hazard of water erosion. Minimizing the risk of erosion is essential in harvesting trees. Maintaining the understory vegetation is essential for the control of erosion. Recently burned-over or harvested areas can be grazed until competition from trees eliminates the grazable forage. The young trees

can be cut for use as Christmas trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low precipitation in summer and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of the density of pinyon and juniper trees in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The potential plant community on the Burnborough Variant soil is mainly mountain big sagebrush, antelope bitterbrush, Columbia needlegrass, and western needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The production of vegetation is limited by cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are surface stones and low available water capacity.

Steepness of slope limits access and movement of livestock on the Nosrac soil. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Burnborough Variant soil. Seeding large areas is difficult. This is because of the pattern in which this soil occurs with the Duco and Nosrac soils. Cold soil temperatures limit plant growth on the Burnborough Variant soil. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the steep slopes on the Duco and Nosrac soils and the shallow depth to bedrock on the Duco soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost.

The Duco soil is in capability subclass VIIe, nonirrigated. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Burnborough Variant soil is in capability subclass VIs, nonirrigated, and range site 26-40.

255—Duco-Searles association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 6,200 to 7,700 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 90 days.

This association is 60 percent Duco stony loam, 15 to 50 percent slopes, and 25 percent Searles very gravelly loam, 30 to 50 percent slopes. The Duco soil is on side slopes and ridges, and the Searles soil is on toe slopes.

Included with these soils in mapping are about 5 percent Indiano soil on north-facing slopes (range site: 26-10), 5 percent very cobbly Deven soils on crests (range site: 26-23), and 2 percent Rock outcrop on ridges. Also included are 1 percent Rubble land on side slopes, 1 percent Brockliss soils, drained, along drainageways (range site: 26-30), and 1 percent Brockliss soils in drainageways adjacent to springs (range site: 26-3). The included soils, Rock outcrop, and Rubble land make up about 15 percent of the mapped areas.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite and metasedimentary rock. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 5 inches thick. The subsoil is brown very gravelly clay loam about 14 inches thick. Hard bedrock is at a depth of 19 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Searles soil is moderately deep and well drained. It formed in colluvium derived dominantly from metavolcanic and rhyolitic rock. Typically, the surface layer is brown very gravelly loam about 4 inches thick. The subsoil is brown very gravelly clay loam about 23 inches thick. Hard bedrock is at a depth of 27 inches.

Permeability of the Searles soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland and wildlife habitat.

The Duco soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity, moderately steep and steep slopes, and high hazard of water erosion.

The Searles soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the steep slopes and high hazard of erosion.

Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting trees can be used. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Minimizing the risk of erosion is essential in harvesting trees. Recently burned-over or harvested areas can be grazed until competition from trees eliminates the grazable forage. The young trees can be cut for use as Christmas trees.

Areas of this association are limited for roads because of the moderately steep and steep slopes and the shallow depth to rock on the Duco soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Stones and cobbles on the surface make the construction of roads difficult. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

The Duco soil is in capability subclass VIIe, nonirrigated. The Searles soil is in capability subclass VIIs, nonirrigated.

261—Dumps-Pits complex, 15 to 75 percent slopes. This map unit is on hills. It consists of mined areas of smoothed and uneven accumulations of waste rocks and areas of open excavations. Without major reclamation, this unit is incapable of supporting plants.

271—East Fork loam. This very deep, somewhat poorly drained soil is on smooth terraces. It formed in alluvium derived dominantly from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 11 inches thick. The upper 34 inches of the underlying material is grayish brown and brown sandy clay loam and clay loam, and the lower part to a depth of 60 inches is brown, stratified clay loam to loam. Some areas have gravelly substrata below a depth of 40 inches.

Included with this soil in mapping are small areas of soils that have altered drainage and are not flooded. The included soils make up about 10 percent of mapped areas.

Permeability of this East Fork soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5 feet from December through May. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare periods of flooding.

Areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat and urban development.

This East Fork soil is well suited to hay, pasture, and crops. The main limitation is the frost-free season of about 100 days. Climatically adapted grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration.

Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Irrigation water needs to be carefully applied to avoid raising the water table. Applications should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients. The organic matter content can be maintained by returning all crop residue, plowing under cover crops, and using a suitable cropping system. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Annual applications of nitrogen and phosphorous fertilizers help maintain production of high quality irrigated crops.

The main limitations for urban development are rare flooding, the moderately slow permeability, and a deep seasonal high water table. Buildings should be located above the expected flood level, or flooding can be controlled by use of major flood control structures. Septic tank absorption fields do not function properly because of wetness and moderately slow permeability. The limitation of moderately slow permeability can be overcome by increasing the size of the absorption field.

This East Fork soil is limited for roads because of low strength of the soil and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

272—East Fork clay loam. This very deep, somewhat poorly drained soil is on smooth terraces. It formed in alluvium derived dominantly from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown clay loam about 11 inches thick. The upper 19 inches of the underlying material is grayish brown sandy clay loam,

and the lower part to a depth of 60 inches is stratified, brown clay loam to loamy sand.

Included with this soil in mapping are small areas of soils that have altered drainage and are not flooded. The included soils make up about 5 percent of mapped areas.

Permeability of this East Fork soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5 feet from December through May. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat and urban development.

This East Fork soil is well suited to hay, pasture, and crops. The main limitation is a frost-free season of about 100 days. Climatically adapted grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration.

Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Irrigation water must be carefully applied to avoid raising the water table. Applications should be adjusted to the available water capacity and the water intake rate. The crop needs to avoid overirrigating and leaching of plant nutrients. The organic matter content can be maintained by returning all crop residue, plowing under cover crops, and using a suitable cropping system. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Annual applications of nitrogen and phosphorous fertilizers are needed to maintain production of high quality irrigated crops.

The main limitations for urban development are rare flooding, the moderately slow permeability, and the seasonal high water table. Buildings need to be located above the expected flood level, or flooding should be controlled by use of major flood control structures. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability. The moderately slow permeability can be overcome by increasing the size of the absorption field.

Areas of this East Fork soil are limited for roads because of low strength and severe frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

281—Fettic very fine sandy loam. This very deep, somewhat poorly drained soil is on low terraces. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 4,600 to 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray very fine sandy loam about 4 inches thick. The subsoil is grayish brown and light brownish gray clay and clay loam about 25 inches thick. It averages clay loam. The substratum to a depth of 60 inches or more is stratified, grayish brown and pale brown fine sandy loam to loamy sand. Rusty mottles are at a depth of about 41 inches. In some areas, very gravelly substrata are below a depth of 40 inches.

Included with this soil in mapping are about 5 percent Voltaire soils on lower terraces (range site: 26-12) and about 5 percent areas of soils that have a clay surface layer.

Permeability of this Fettic soil is very slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5 feet from December through May. This soil is moderately affected by salt and alkali in the subsoil, but it is not affected or only slightly affected in the surface layer. This soil is subject to occasional, brief flooding from December through March.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this Fettic soil is mainly black greasewood, big saltbrush, inland saltgrass, and alkali sacaton. The present vegetation in most areas is mainly black greasewood, big sagebrush, rubber rabbitbrush, and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by strongly saline-alkali conditions in the subsoil and the low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are strongly saline-alkali conditions in the subsoil and the low average annual precipitation. Loss of the surface layer results in a severe decrease in productivity and in the potential to produce vegetation suitable for grazing. Grazing when the soil is wet results in compaction of the surface layer and excessive runoff. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this Fettic soil are limited for roads because of low strength, occasional flooding, and severe frost heave. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Flooding can be controlled by use of major flood control structures. Roads should be provided with adequate

surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIw, nonirrigated. It is in range site 26-13.

282—Fettic clay, strongly saline. This very deep, somewhat poorly drained soil is on low terraces. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 4 inches thick. The subsoil is grayish brown and light brownish gray clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is stratifed, grayish brown and pale brown very fine sandy loam to loamy sand.

Included with this soil in mapping is about 10 percent Voltaire soils on slightly lower alluvial fans (range site: 26-12).

Permeability of this Fettic soil is very slow. Available water capacity is high. Runoff is slight. The hazard of soil blowing is slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5 feet from December through May. This soil is strongly affected by salt and alkali in the surface layer and subsoil. It is subject to occasional brief flooding from December through March.

Areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly black greasewood, basin big sagebrush, creeping wildrye, and basin wildrye. The present vegetation in most areas is mainly black greasewood, big sagebrush, rubber rabbitbrush, and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the high salt concentrations and low average annual precipitation. Improving the quantity and quality of available forage is difficult because of continuous addition of salts by capillary movement from the deep water table. The suitability of this soil for rangeland seeding is very poor. the main limitations for seeding are the high concentrations of salt and low average annual precipitation. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are occasional flooding, unstable sidewalls of excavations, the deep water table, and very slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and slow permeability. Because of the rapidly permeable substrata at a depth of 29 inches, housing developments of moderate to high density need community sewer systems to prevent contamination of water supplies.

Areas of this soil are limited for roads because of low strength in the soil, occasional flooding, and severe frost heave. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Local roads and streets require a special base in some areas to avoid frost heave damage. Flooding can be controlled by use of major flood control structures. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIw, nonirrigated. It is in range site 26-12.

292—Vicee Variant-Rock outcrop complex, 30 to 50 percent slopes. This complex is on slopes of mountains. Elevation is 8,500 to 9,000 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 42 degrees F., and the average frost-free period is about 35 days.

This complex is 70 percent Vicee Variant extremely stony very fine sandy loam, 30 to 50 percent slopes, and 15 percent Rock outcrop. The Vicee Variant soil is on side slopes, and Rock outcrop is on ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping is about 15 percent loamy-skeletal, mixed, shallow Typic Cryoborolls adjacent to the Rock outcrop and on ridges (woodland site: Pine-fir woodland).

The Vicee Variant soil is moderately deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with 40 to 50 percent stones. The surface layer is grayish brown extremely stony very fine sandy loam about 14 inches thick. The subsoil is very cobbly loam about 7 inches thick. The substratum is light olive gray very cobbly loam about 15 inches thick. Metavolcanic bedrock is at a depth of 36 inches. In a few small areas slopes are 4 to 15 percent.

Permeability of this Vicee Variant soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 24 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Rock outcrop consists of exposed bedrock and less than 10 percent soil material. Adjoining the Tahoe Basin Area are a few large areas of Rock outcrop and intermingled small areas of soils.

Areas of this complex are used for woodland and wildlife habitat.

The Vicee Variant soil is suited to the production of California red fir. Based on a site index of 62, the

potential production per acre of merchantable timber is 17,250 cubic feet or 122,570 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting are the steep slopes, very low available water capacity, high hazard of erosion, and extremely stony surface. Management that minimizes the risk of erosion is essential in harvesting trees. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting are difficult to use because of the steepness of slope. Highlead or other cable logging methods can be used. Use of these methods is limited during December through May. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Hand planting of nursery stock is generally necessary to establish or improve a stand.

Areas of this complex are limited for roads because of the steep slopes and extremely stony surface. Special design of roads is needed to overcome the limitations of slope. Stones on the surface make the construction of roads difficult. Roads should be located on the less sloping areas, if possible, to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and recover maintenance costs. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIs, nonirrigated.

301—Franktown-Rubble land-Rock outcrop complex, 50 to 75 percent slopes. This complex is on the east-facing slopes of the Carson Range. Elevation is 5,200 to 7,500 feet. The average annual precipitation is about 20 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 75 days.

This complex is 40 percent Franktown very stony sandy loam, 50 to 75 percent slopes, 30 percent Rubble land, and 20 percent Rock outcrop. The Franktown soil is on the upper part of side slopes between and above the Rock outcrop. Rubble land is adjacent to or below the Rock outcrop on the side slopes. Rock outcrop is on side slopes and ridges.

Included with this complex in mapping are small areas of Holbrook soils along the toe slopes of the mountain below the north-south fault escarpment that traverses this complex (range site: 26-10). The included soils make up about 10 percent of mapped areas.

The Franktown soil is shallow or very shallow and somewhat excessively drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface is covered with a mat of pine needles about 1 inch thick. The surface layer is olive gray very stony sandy loam about 5 inches thick. The underlying material to a depth of 10 inches is light olive gray extremely gravelly sandy loam. Hard bedrock is at a depth of 10 inches.

Permeability of the Franktown soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 6 to 20 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rubble land consists of areas of stones, boulders, and cobbles that are virtually free of vegetation, except for lichens.

Rock outcrop is exposed bedrock. It is less than 10 percent soil material.

Areas of this complex are used mainly for Jeffrey pine woodland and wildlife habitat.

This Franktown soil is suited to the production of Jeffrey pine. Based on a site index of 42, the potential production per acre of merchantable timber is 366 cubic feet or 1,000 broad feet (Scribner rule) from an even-aged fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the severe hazard of erosion, severe equipment limitation because of slope, severe seedling mortality, and severe plant competition. Management that minimizes the risk of erosion is essential in harvesting trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Conventional methods of harvesting are difficult to use because of the steepness of slope. Highlead or other cable logging methods can be used. Use of these methods is limited during November through May. The steepness of slope limits the kinds of equipment that can be used in forest management.

Areas of this complex are limited for roads because of the very steep slopes, shallow depth to bedrock, and exposed bedrock. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided. Stones and cobbles on the surface make the construction of roads difficult. Cutting and filling can be reduced by building roads in less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIs, nonirrigated.

311—Gardnerville clay loam. This very deep, somewhat poorly drained soil is on smooth alluvial fans. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown clay loam about 3 inches thick. The subsoil is brown clay and grayish brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is weakly silica-cemented, brown, stratified coarse sandy loam to loamy coarse sand. In some areas a gravelly substratum is below a depth of 24 inches.

Included with this soil in mapping are small areas of Godecke soils in swales. The included soils make up about 5 percent of mapped areas.

Permeability of this Gardnerville soil is slow. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is slightly affected by salt and alkali in the surface layer and subsoil. It is subject to rare flooding.

Areas of this soil are used for irrigated hay, pasture, and crops and for urban development and wildlife habitat.

This Gardnerville soil is well suited to hay and pasture. The main limitations are the slightly saline-alkali condition, moderate available water capacity, and slow permeability. Grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low water infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is well suited to irrigated crops. It is limited mainly by the slightly saline-alkali condition, slow permeability, and moderate available water capacity. Because of slow permeability in this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Intensive management is required to reduce the salinity and alkali and maintain soil productivity. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil. Crusting of the surface and compaction can be reduced by returning crop residue to the soil.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and inadequate filtration of septic tank effluent. Buildings should be located above the expected flood level. Because the substratum is rapidly permeable, special design is needed in some areas to avoid sewage effluent pollution of ground water or nearby water supplies.

Areas of this Gardnerville soil are moderately limited for roads because of rare flooding. The flooding can be controlled by use of major flood control structures. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

312—Gardnerville clay loam, drained. This very deep, somewhat poorly drained soil is on smooth alluvial fans. The drainage has been altered. This soil formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 3 inches thick. The subsoil is brown clay about 13 inches thick. The underlying material to a depth of 60 inches is brown, weakly silica-cemented, stratified coarse sandy loam and loamy sand. Iron mottles are below a depth of about 36 inches.

Included with this soil in mapping is about 5 percent Godecke soils in small swales (range site: 26-12).

Permeability of this Gardnerville soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. A seasonal high water table is at a depth of more than 60 inches. The subsoil is slightly affected by salt and alkali. The soil is subject to rare flooding.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat. Areas can be used for irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, rubber rabbitbrush, and creeping wildrye. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and salts and alkali in the subsoil. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low average annual precipitation and slightly saline-alkali condition within a depth of 7 inches. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and inadequate filtration of septic tank effluent. Buildings should be located above the expected flood level. Because the substratum is rapidly permeable, special design is needed in some areas to avoid sewage effluent pollution of ground water or nearby water supplies.

Areas of this Gardnerville soil are moderately limited for roads because of rare flooding. Flooding can be controlled by use of major flood control structures. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads

should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIIs, irrigated, and capability subclass VIIs, nonirrigated. It is in range site 26-12.

313—Gardnerville clay loam, slightly saline-alkali. This very deep, somewhat poorly drained soil is on smooth alluvial fans. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 3 inches thick. The subsoil is brown clay and clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is weakly silica-cemented, brown, stratified coarse sandy loam and loamy coarse sand.

Included with this soil in mapping are small areas of soils that are affected strongly by salts and alkali in the surface layer. The included soils make up about 10 percent of mapped areas.

Permeability of this Gardnerville soil is slow. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding. It is slightly saline and alkaline throughout.

Areas of this soil are used for irrigated hay, pasture, and crops and for urban development and wildlife habitat.

This Gardnerville soil is suited to hay and pasture. The main limitations are the slightly saline-alkali condition, the slow permeability, and moderate available water capacity. The concentration of salts and alkali in the surface layer and subsoil limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Salt-tolerant grasses and legumes are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration.

This soil is suited to irrigated crops. It is limited mainly by the moderate available water capacity, by the slightly saline-alkali condition, and by the slow permeability. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil. The content of salts and alkali can be reduced by using soil amendments, such as gypsum, by leaching, and by carefully applying irrigation water. Because of the slow permeability the application of water should be regulated so that water does not stand on the surface and damage the crops. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Salinity influences the choice of crops. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are rare flooding, inadequate filtration of septic tank effluent, unstable sidewalls of cutbanks, and the saline-alkali condition. Buildings should be located above the expected flood level. Because the substratum is rapidly permeable, special design is needed in some areas to avoid sewage effluent pollution of ground water or nearby water supplies. Plants selected for landscaping should be salt- and alkali-tolerant species.

Areas of this Gardnerville soil are moderately limited for roads because of rare flooding. Major flood control structures help to control the flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIIw, irrigated.

314—Gardnerville clay. This very deep, somewhat poorly drained soil is on alluvial terraces. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown clay about 7 inches thick. The subsoil is brown clay about 11 inches thick. The substratum to a depth of 60 inches or more is weakly silica-cemented, stratified, brown and pale brown coarse sandy loam and loamy sand. The clay texture of the surface layer is the result of mixing the surface layer with the upper part of the subsoil by plowing and leveling.

Included with this soil in mapping are small areas of soils that are not subject to flooding. The included soils make up about 5 percent of mapped areas.

Permeability of this Gardnerville soil is slow. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. The subsoil is slightly affected by salt and alkali. The soil is subject to rare flooding.

Areas of this soil are used for irrigated hay, pasture, and crops and for urban development and wildlife habitat.

This Gardnerville soil is well suited to hay and pasture. The main limitations are the slightly saline-alkali condition in the subsoil, slow infiltration, slow permeability, and moderate available water capacity. Grasses and legumes grow well if adequate fertilizer is

used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth.

This soil is well suited to irrigated crops. It is limited mainly by slow infiltration, the slightly saline-alkali condition in the subsoil, and slow permeability. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Because of the slow infiltration and slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. The organic matter content can be maintained by returning all crop residue, plowing under cover crops, and using a suitable cropping system. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are rare flooding, unstable sidewalls of cutbanks, and inadequate filtration of septic tank effluent. Buildings should be located above the expected flood level. Because the substratum is rapidly permeable, special design is needed in some areas to prevent sewage effluent from polluting ground water or nearby water supplies.

Areas of this Gardnerville soil are moderately limited for roads because of rare flooding. Major flood control structures help to control flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIw, irrigated.

315—Gardnerville clay, slightly saline-alkali. This very deep, somewhat poorly drained soil is on alluvial terraces. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown clay about 6 inches thick. The subsoil is brown clay about 10 inches thick. The substratum to a depth of 60 inches or more is weakly silica-cemented, stratified, brown and pale brown coarse sandy loam and loamy coarse sand.

Included with this soil in mapping are small areas of soils that are strongly affected by salt and alkali. The included soils make up about 10 percent of mapped areas.

Permeability of this Gardnerville soil is slow. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. The surface layer is slightly affected by salt and alkali and the subsoil is moderately affected. This soil is subject to rare flooding.

Areas of this soil are used for irrigated hay and crops and for urban development and wildlife habitat.

This Gardnerville soil is suited to hay and pasture. The main limitations are slow infiltration, slow permeability, moderate available water capacity, and the slightly saline-alkali condition in the surface layer and moderate condition in the subsoil. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. Leveling helps to insure the uniform application of water.

This soil is suited to irrigated crops. It is limited mainly by slow infiltration, slow permeability, moderate available water capacity, and the slightly saline-alkali condition in the surface layer and moderate condition in the subsoil. Border and corrugation irrigation methods are suited to this soil. Intensive management is required to reduce the salinity and maintain soil productivity. Salinity influences the choice of crops. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil. The content of salts and alkali can be reduced by using soil amendments, such as gypsum, by leaching, and by carefully applying irrigation water. Because of the slow infiltration and slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

The main limitations for urban development are rare flooding, inadequate filtration of septic tank effluent, unstable sidewalls of cutbanks, and the saline-alkali condition. Because of the rapidly permeable substratum, special design is needed to avoid pollution of ground water or nearby water supplies. Buildings should be located above the expected flood level. Selection of salt- and alkali-tolerant species is critical for landscaping.

Areas of this Gardnerville soil are moderately limited for roads because of rare flooding. Major flood control structures help to control flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass IIIw, irrigated.

321—Genoa-Glean association. This association is on ridges and slopes of mountains. Slope is 15 to 50 percent. Elevation is 8,700 to 9,200 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 60 days.

This association is 70 percent Genoa extremely cobbly sandy loam, 15 to 50 percent slopes, and 15 percent Glean stony sandy loam, 15 to 50 percent slopes. The Genoa soil is on mountain ridges and south-facing slopes, and the Glean soil is on north-facing concave slopes.

Included with these soils in mapping are about 7 percent loamy-skeletal, mixed, frigid Typic Haploxerolls on alluvial fans in narrow valleys (range site: 26-5), 6 percent loamy-skeletal, mixed, frigid Cumulic Haplaquolls on valley bottoms (range site: 26-3), and 2 percent loamy-skeletal, mixed, frigid Typic Haploxerolls on north-facing toe slopes (woodland site: Aspen woodland). The included soils make up about 15 percent of mapped areas.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with about 25 to 35 percent cobbles. The surface layer is brown and dark grayish brown extremely cobbly sandy loam about 4 inches thick. The subsoil is brown and yellowish brown extremely cobbly loam about 12 inches thick. Granitic bedrock is at a depth of 16 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from intrusive and metavolcanic rocks. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony sandy loam about 6 inches thick. The upper 33 inches of the underlying material is dark grayish brown very gravelly sandy loam, and the lower part to a depth of 60 inches is light yellowish brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Genoa soil is mainly low sagebrush, Thurber needlegrass, Sandberg bluegrass, and antelope bitterbrush. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes.

The potential plant community on the Glean soil is mainly mountain big sagebrush, western needlegrass, and Columbia needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, basin wildrye, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Machinery is not practical in range management, because the surface is stony and extremely cobbly and the slopes are steep. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soils have warmed up and the plants have achieved sufficient growth. Slope limits access by livestock and results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the soils from excessive erosion.

The soils in this association are limited for roads because of the moderately steep and steep slopes and by the high cobble content and shallow depth to bedrock in the Genoa soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, cobbles and stones in the soil are road hazards and result in increased maintenance cost.

The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28. The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38.

322—Genoa-Glean-Rock outcrop association. This association is on mountains. Slope is 15 to 50 percent. Elevation is 7,800 to 8,850 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 70 days.

This association is 45 percent Genoa extremely stony loam, 15 to 50 percent slopes, 25 percent Glean stony sandy loam, 15 to 50 percent slopes, and 15 percent Rock outcrop. The Genoa soil is on convex ridges and shoulders, the Glean soil is on concave side slopes, and Rock outcrop is on ridges.

Included with this association in mapping are about 5 percent Rubble land on steep back slopes below outcrops of rock, 5 percent Chen soils on convex east-facing ridges (range site: 26-28), and 5 percent Borda Variant soils on pediments (range site: 26-39). The

included soils and Rubble land make up about 15 percent of mapped areas.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 15 to 45 percent stones. The surface layer is grayish brown extremely stony loam about 4 inches thick. The subsoil is brown very cobbly sandy clay loam about 8 inches thick. Hard granitic bedrock is at a depth of 12 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from intrusive and metavolcanic rocks. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony sandy loam about 6 inches thick. Next is about 19 inches of brown very gravelly loam. Below that to a depth of 60 inches or more is yellowish brown very cobbly loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Genoa soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and steep slopes.

The potential plant community on the Glean soil is mainly mountain big sagebrush, spike-fescue, basin wildrye, and western needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, green ephedra, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Machinery is not practical in range management, because the surface is stony and slopes are steep. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth to withstand grazing pressure. Slope limits access by livestock and results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the soils from excessive erosion.

Areas of this association are limited for roads because of moderately steep and steep slopes, high content of cobbles, and shallow depth to bedrock on the Genoa soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, stones in the soil are road hazards and result in increased maintenance costs.

The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28. The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38. Rock outcrop is in capability subclass VIIIs, nonirrigated.

331—Glean-Genoa association. This association is on slopes and ridges of mountains. Slope is 4 to 50 percent. Elevation is 8,000 to 8,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 70 days.

This association is 50 percent Glean very gravelly sandy loam, 30 to 50 percent slopes, 20 percent Genoa extremely stony sandy loam, 4 to 15 percent slopes, and 15 percent Glean very gravelly sandy loam, 4 to 15 percent slopes. The Glean soil, 30 to 50 percent slopes, is on south-facing side slopes, the Genoa soil is on ridges, and the Glean soil, 4 to 15 percent slopes, is on north-facing convex side slopes.

Included in this association are about 2 percent Rock outcrop on ridges, 3 percent loamy-skeletal, mixed, frigid Cumulic Haplaquolls adjacent to springs and seeps (range site: 26-3), and 10 percent Burnborough soils on south-facing foot slopes (range site: 26-5). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Glean soil, 30 to 50 percent slopes, is deep and very deep and well drained. It formed in colluvium derived dominantly from intrusive and metavolcanic rocks. Typically, the surface layer is dark grayish brown very gravelly sandy loam about 6 inches thick. The upper 22 inches of the underlying material is dark grayish brown very gravelly sandy loam, and the lower part to a depth of 60 inches is brown very cobbly loam.

Permeability of the Glean soil, 30 to 50 percent slopes, is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 15 to 40 percent stones. The surface layer is grayish brown extremely stony sandy loam about 2 inches thick. The subsoil is brown very cobbly sandy clay loam about 17 inches thick. Hard granitic bedrock is at a depth of 19 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil, 4 to 15 percent slopes, is deep and well drained. It formed in colluvium derived dominantly from granitic bedrock. Typically, the surface layer is grayish brown and brown very gravelly sandy loam about 6 inches thick. The upper 24 inches of the underlying material is dark grayish brown very gravelly sandy loam, and the lower part to a depth of 60 inches is pale brown very cobbly loam.

Permeability of the Glean soil, 4 to 15 percent slopes, is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Glean soils is mainly mountain big sagebrush, Columbia needlegrass, western needlegrass, and basin wildrye. The present vegetation in most areas is mainly mountain big sagebrush, snowberry, and mountain brome. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and low available water capacity. The suitability of these soils for rangeland seeding is very poor. The main limitations for seeding are low available water capacity in the surface layer and steepness of the south-facing slopes.

The potential plant community on the Genoa soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and the extremely stony surface.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect these soils from excessive erosion and to prevent overgrazing in the less sloping areas of the north-facing Glean and Genoa soils. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soils have warmed up and the plants have achieved sufficient growth to withstand grazing pressure.

The soils in this association are limited for roads because of steep, south-facing slopes on the Glean soils and because of shallow depth to bedrock and large stones on the Genoa soils. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, stones in the soil are road hazards and result in increased maintenance cost.

The Glean soil, 30 to 50 percent slopes, is in capability subclass VIIe, nonirrigated, and range site 26-38. The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28. The Glean soil, 4 to 15 percent slopes, is in capability subclass VIIs, nonirrigated, and range site 26-38.

332—Glean-Genoa-Rubble land association. This association is on slopes and ridges of mountains. Slope is 4 to 75 percent. Elevation is 8,000 to 9,500 feet. The average annual precipitation is about 16 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 70 days.

This association is 50 percent Glean extremely stony sandy loam, 50 to 75 percent slopes, 20 percent Genoa extremely stony sandy loam, 4 to 15 percent slopes, and 15 percent Rubble land. The Glean soil is on very steep side slopes, the Genoa soil is on ridges, and Rubble land is on very steep mountain slopes below outcrops of rock.

Included with this association in mapping are about 5 percent loamy, mixed, frigid Lithic Argixerolls on very steep slopes (range site: 26-9), 5 percent Burnborough soils on the lower part of concave side slopes (range site: 26-5), and 5 percent Rock outcrop on ridges and side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 15 to 50 percent stones. The surface layer is grayish brown extremely stony sandy loam about 6 inches thick. The upper 19 inches of the underlying material is brown very gravelly sandy loam, and the lower part to a depth of 60 inches is pale brown very cobbly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 15 to 45 percent stones. The surface layer is dark grayish brown

extremely stony sandy loam about 4 inches thick. The subsoil is brown very cobbly sandy clay loam about 12 inches thick. Hard granitic bedrock is at a depth of 16 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Rubble land consists of cobbles and stones on side slopes below outcrops of rock.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Glean soil is mainly mountain big sagebrush, Columbia needlegrass, western needlegrass, and basin wildrye. The present vegetation in most areas is mainly mountain big sagebrush and Columbia needlegrass. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very steep slopes and extremely stony surfaces.

The potential plant community on the Genoa soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and the extremely stony surface.

Cold soil temperatures in the soils in this association limit plant growth. Grazing therefore should be delayed until the soils have warmed up and the plants have achieved sufficient growth. The use of machinery is not practical because the surface is stony and the slopes are steep. Steepness of slope on the Glean soil limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Genoa soil.

Areas of this association are limited for roads because of very steep slopes on the Glean soil and the shallow depth to bedrock and the presence of stones on the Genoa soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soil. Unless an adequate wearing surface is maintained, stones in the soil are road hazards and result in increased maintenance cost. Cutting and filling can be reduced by building roads in less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38. The Genoa soil is in capability subclass VIIs, nonirrigated, and range site 26-28. Rubble land is in capability subclass VIIIs, nonirrigated.

334—Glean-Sup-Genoa association. This association is on slopes and ridges of mountains. Slope is 15 to 50 percent. Elevation is 8,000 to 9,000 feet. The average annual precipitation is about 16 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 65 days.

This association is 35 percent Glean very stony sandy loam, 15 to 50 percent slopes, 25 percent Sup stony loam, 15 to 50 percent slopes, and 15 percent Genoa extremely stony sandy loam, 15 to 30 percent slopes. The Glean soil is on south-facing side slopes. The Sup soil is mainly on north-facing slopes, concave side slopes, and south-facing slopes near ridges. The Genoa soil is on ridges.

Included with these soils in mapping are about 2 percent very gravelly clayey Chen soils (range site: 26-28), 3 percent Rubble land on slopes below outcrops of rock, and 10 percent Rock outcrop mostly on ridges. The included soils, Rubble land, and Rock outcrop make up about 15 percent of mapped areas.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is dark grayish brown very stony sandy loam about 2 inches thick. Below this is 21 inches of grayish brown and dark grayish brown very gravelly loam. The underlying material to a depth of 60 inches is pale brown very gravelly loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Sup soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 12 inches thick. The underlying material to a depth of 60 inches is stratified, light brownish gray and pale brown very cobbly sandy loam to extremely gravelly fine sandy loam.

Permeability of the Sup soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 15 to 40 percent stones. The surface layer is grayish brown extremely

stony sandy loam about 2 inches thick. The subsoil is brown extremely cobbly sandy clay loam about 17 inches thick. Hard granitic bedrock is at a depth of 19 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Glean soil is mainly mountain big sagebrush, basin wildrye, and western needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, basin wildrye, and mountain brome. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Sup soil is mainly curlleaf mountainmahogany, mountain big sagebrush, pine bluegrass, and basin wildrye. The present vegetation in most areas is mainly curlleaf mountainmahogany, mountain big sagebrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Genoa soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by very low available water capacity and the cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and the extremely stony surface.

Steepness of slope on soils in this association limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Because of the very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover on the Genoa soil even if grazing management is good. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of moderately steep and steep slopes, large stones, and the shallow depth to bedrock in the Genoa soil. Because of the underlying bedrock deep cuts should be avoided, especially on the Genoa soil. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38. The Sup soil is in capability subclass VIIs, nonirrigated, and range site 26-9. The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28.

341—Glenbrook sands, 8 to 30 percent slopes. This undifferentiated group is on low rolling hills. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This undifferentiated group is 50 percent Glenbrook sand, 8 to 15 percent slopes, and 45 percent Glenbrook sand, 15 to 30 percent slopes. The Glenbrook sand, 8 to 15 percent slopes, is on lower side slopes and toe slopes. The Glenbrook sand, 15 to 30 percent slopes, is on upper side slopes. The components of this group are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping is about 5 percent Rock outcrop on ridges.

The Glenbrook soil, 8 to 15 percent slopes, is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown sand about 8 inches thick. The underlying material to a depth of 15 inches is light brownish gray gravelly loamy coarse sand. Weathered granite bedrock is at a depth of 15 inches. In small areas adjacent to the Carson City area, the surface texture is gravelly loamy coarse sand and slopes are 4 to 8 percent.

Permeability of the Glenbrook soil, 8 to 15 percent slopes, is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Glenbrook soil, 15 to 30 percent slopes, is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown sand about 9 inches thick. The underlying material to a depth of 15 inches is light brownish gray gravelly loamy coarse sand. Weathered granite bedrock is at a depth of 15 inches.

Permeability of the Glenbrook soil, 15 to 30 percent slopes, is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

Areas of these soils are used for livestock grazing and wildlife habitat. Some areas are used for urban development.

The potential plant community on these soils is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately high average annual precipitation. Livestock grazing should be managed to protect the soils from excessive water erosion and soil blowing and to avoid overuse of the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing. Because of the very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the most desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of these soils for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The main limitations for urban development are the strongly sloping to moderately steep slopes and the shallow depth to bedrock. Deep cuts needed to level sites for building can expose bedrock. Septic tank absorption fields require special design to overcome the limitations of slope and shallow depth.

Areas of these soils are limited for roads because of steep slopes. In strongly sloping areas, slope and shallow depth to soft bedrock are moderate limitations. Because of the underlying bedrock, deep cuts should be avoided. Roads need to be located in less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Design for roads should provide surface drainage.

These soils are in capability subclass VIIe, nonirrigated. They are in range site 26-18.

342—Glenbrook-Rock outcrop complex, 30 to 50 percent slopes. This complex is on rounded foothills. Elevation is 5,000 to 5,500 feet. The average annual precipitition is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This complex is 75 percent Glenbrook gravelly loamy coarse sand, 30 to 50 percent slopes, and 15 percent Rock outcrop. The Glenbrook soil is on side slopes, and the Rock outcrop is on ridges and crests. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping is about 10 percent Mottsville soils on the toe slopes (range site: 26-8).

The Glenbrook soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. The surface layer is grayish brown gravelly loamy coarse sand about 9 inches thick. The underlying material to a depth of 15 inches is grayish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 15 inches. In some areas the surface layer is stony.

Permeability of the Glenbrook soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren rock and less than 10 percent soil material.

Areas of this complex are used for livestock grazing and wildlife habitat.

The potential plant community on the Glenbrook soil is mainly antelope bitterbrush, Wyoming big sagebrush, desert needlegrass, and Thurber needlegrass. The present vegetation in most areas is mainly antelope bitterbrush, Wyoming big sagebrush, desert needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately high average annual precipitation. Steepness of slope limits access and movement of livestock.

Livestock grazing should be managed to protect this soil from excessive erosion and to prevent overgrazing in the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of this soil to produce vegetation suitable for grazing. Because of the very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

Areas of this complex are limited for roads because of steep slopes and common outcrops of rock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIe, nonirrigated. It is in range site 26-18.

351—Godecke fine sandy loam. This very deep, somewhat poorly drained soil is on smooth terraces. It formed in alluvium derived from granite, basalt, and

ryolite and from metamorphic and sedimentary rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray and pale brown fine sandy loam about 8 inches thick. The subsoil is pale brown clay loam about 10 inches thick. The upper 6 inches of the substratum is pale brown coarse sandy loam, and the lower part to a depth of 60 inches is stratified, pale brown and pale yellow loamy sand to fine sandy loam. The lower part of the substratum has weak silica cementation in parts. In some areas the slope is 2 to 4 percent.

Included with this soil in mapping adjoining the Carson City area are about 5 percent shallow, loamy, Natric Duraquolls along drainageways (range site: 26-12) and about 5 percent Updike Variant loam along bench areas paralleling drainageways (range site 26-12).

Permeability of this Godecke soil is slow. Available water capacity is moderate. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5 feet from December through May. Salt and alkali strongly affect the surface layer and moderately affect the subsoil. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing, irrigated hay and pasture, urban development, and wildlife habitat. Small areas have been reclaimed and are used for irrigated crops.

The potential plant community on this soil is mainly basin big sagebrush, black greasewood, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, rubber rabbitbrush, inland saltgrass, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by the strongly saline-alkali soil condition, moderately low average annual precipitation, and moderate available water capacity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkali soil condition.

This soil is poorly suited to hay and pasture. The main limitations are the strongly saline-alkali soil condition and slow infiltration. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

Irrigated crops are poorly suited to this soil. The strongly saline-alkali soil condition and slow permeability are the main limitations. A water table that develops during the irrigation period generally limits the suitability of this soil for deep-rooted crops. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Because of the slow permeability the application of water should be regulated so that water does not stand on the surface and damage the crops. Intensive management is required to reduce the salinity and maintain productivity. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. The content of salts and alkali can be reduced by using soil amendments, such as gypsum, by leaching, and by carefully applying irrigation water. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table.

The main limitations for urban development are rare flooding, a deep seasonal water table, poor filtration of septic tank effluent, and unstable sidewalls in cutbanks. Buildings should be located above the expected flood plain. Special design of footings is needed to overcome the moderately expandable clay. Plants that tolerate a seasonal high water table and droughtiness should be selected. Septic tank absorption fields do not function properly because of wetness; the poorly filtered effluent is a hazard to contamination of ground water.

Areas of this soil are limited for roads because of severe frost heave. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IVs, irrigated, and VIIs, nonirrigated. It is in range site 26-12.

362—Gralic-Rock outcrop complex, 8 to 50 percent slopes. This complex is on slopes of mountains. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 37 degrees F., and the average frost-free period is about 40 days.

This complex is 45 percent Gralic extremely stony very fine sandy loam, 30 to 50 percent slopes, 25 percent Gralic extremely stony very fine sandy loam, 8 to 15 percent slopes, and 15 percent Rock outcrop. The Gralic soil, 30 to 50 percent slopes, is on side slopes, the Gralic soil, 8 to 15 percent slopes, is on toe slopes and pediments, and Rock outcrop is on ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 10 percent Vicee Variant soils that have a dark surface layer and are on convex upper side slopes (woodland site: Pine-fir woodland) and about 5 percent loamy-skeletal, mixed Lithic Cryorthents that are shallow to bedrock and on ridges (woodland site: Pine-fir woodland). The included soils make up about 15 percent of mapped areas.

The Gralic soil, 30 to 50 percent slopes, is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with a mat of pine needles about 1 inch thick. The surface layer is brown extremely stony very fine sandy loam about 3 inches thick. The underlying material to a depth of 60 inches is pale brown extremely gravelly very fine sandy loam.

Permeability of the Gralic soil, 30 to 50 percent slopes, is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Gralic soil, 8 to 15 percent slopes, is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is brown extremely stony very fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches is pale brown extremely gravelly very fine sandy loam.

Permeability of the Gralic soil, 8 to 15 percent slopes, is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Rock outcrop consists of exposed bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Gralic soils are suited to the production of California red fir. Based on a site index of 25, the potential production per acre of merchantable timber is 7,050 cubic feet or 35,050 board feet (Scribner rule). The main concerns in producing and harvesting trees are the extremely stony surface, low available water capacity, and moderate hazard of erosion on steep slopes. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting are difficult to use in steep areas because of the steepness of slope and the moderate hazard of erosion. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited from December through June. The low available water capacity generally influences seedling survival. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Hand planting of nursery stock is generally necessary to establish or improve a stand.

Areas of this complex are limited for roads because of the steep slopes, moderate frost heave, and the extremely stony surface. Cutting and filliing can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost.

This complex is in capability subclass VIIs, nonirrigated.

363—Gralic-Rock outcrop complex, 50 to 75 percent slopes. This complex is on slopes of mountains. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 37 degrees F., and the average frost-free period is about 40 days.

This complex is 75 percent Gralic very stony fine sandy loam, 50 to 75 percent slopes, and 15 percent Rock outcrop. The Gralic soil is on side slopes, and Rock outcrop is on ridges and side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping is about 10 percent loamy-skeletal, mixed Lithic Cryorthents that are shallow to bedrock and are on ridges (woodland site: Pine-fir woodland).

The Gralic soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with a mat of pine needles about 1 inch thick. The surface is brown very stony fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches is pale brown extremely gravelly very fine sandy loam.

Permeability of the Gralic soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Gralic soil is suited to the production of California red fir. Based on a site index of 25, the potential production per acre of merchantable timber is 7,000 cubic feet or 35,000 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very stony surface, very steep slopes, moderate erosion hazard, and low available water capacity. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting are difficult because of the steepness of slope and the moderate hazard of erosion. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited during December through June. The low available water capacity generally influences seedling survival. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

Areas of this complex are limited for roads because of the very steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIs, nonirrigated.

371—Graylock extremely stony loamy coarse sand, 30 to 50 percent slopes. This deep, excessively drained soil is on side slopes of mountains. It formed in colluvium derived from granitic rock. Elevation is 7,500 to 9,000 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 38 degrees F., and the average frost-free period is about 35 days.

Typically, the surface is covered with a mat of pine needles and duff about 3 inches thick. The surface layer is grayish brown extremely stony loamy coarse sand about 5 inches thick. The underlying material to a depth of 42 inches is light brownish gray extremely stony loamy coarse sand. Hard granite bedrock is at a depth of 42 inches.

Included with this soil in mapping are about 7 percent Witefels soils that have less than 35 percent rock fragments in the profile and are on concave side slopes (woodland site: Pine-fir woodland), 5 percent Temo soils on ridges (woodland site: Pine-fir woodland), and 3 percent Rock outcrop. The included soils and Rock outcrop make up about 15 percent of mapped areas.

Permeability of this Graylock soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 60 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for woodland and wildlife habitat.

This soil is suited to the production of California red fir. Based on a site index of 28, the potential production per acre of merchantable timber is 7,710 cubic feet or 40,720 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting are the steep slopes and extreme stoniness. Stones on the surface can interfere with the use of equipment. Conventional methods of harvest are difficut to use because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited during November through May. Reforestation after harvesting must be carefully managed to reduce competition from undesirable understory plants. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. The steepness of slope limits the kinds of equipment that can be used in forest management. Hand planting of nursery stock is generally necessary to establish or improve a stand. Management that minimizes the risk of erosion is essential in harvesting.

Areas of this soil are limited for roads because of steep slopes and extreme stoniness. Stones in the soil are road hazards and result in increased maintenance costs, unless an adequate wearing surface is maintained. Roads should be located in less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage. Special design of roads is needed to overcome the slope limitation.

This soil is in capability subclass VIIs, nonirrigated.

372—Graylock extremely stony loamy coarse sand, 50 to 75 percent slopes. This deep, excessively drained soil is on side slopes of mountains. It formed in colluvium derived dominantly from granitic rock. Elevation is 7,500 to 8,500 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 38 degrees F., and the average frost-free period is about 35 days.

Typically, the surface is covered with a mat of pine needles and duff about 2 inches thick. The surface layer is grayish brown extremely stony loamy coarse sand about 3 inches thick. The underlying material to a depth of 42 inches is light grayish brown extremely stony loamy coarse sand. Hard granite bedrock is at a depth of 42 inches.

Included with this soil in mapping are about 7 percent Witefels soils that have less than 35 percent rock fragments in the profile and are on concave side slopes (woodland site: Pine-fir woodland), 5 percent Temo soils that are shallow to bedrock and on ridges (woodland site: Pine-fir woodland), and 3 percent Rock outcrop. The included soils and Rock outcrop make up about 15 percent of mapped areas.

Permeability of this Graylock soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 60 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for woodland and wildlife habitat.

This soil is suited to the production of California red fir. Based on a site index of 28, the potential production per acre of merchantable timber is 7,710 cubic feet or 40,720 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very steep slopes, extreme stoniness, and severe plant competition. Stones on the surface can interfere with the use of equipment. Management that minimizes the risk

of erosion is essential in harvesting trees. Conventional methods of harvesting are difficult to use because of the steepness of the slope. Highlead or other cable logging methods can be used. Use of these methods is limited during November through May. Reforestation after harvesting must be carefully managed to reduce competition from undesirable understory plants. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Hand planting of nursery stock is generally necessary to establish or improve a stand. The steepness of slope limits the kinds of equipment that can be used in forest management.

Areas of this soil are limited for roads because of the very steep slopes and extreme stoniness. Stones in the soil are road hazards and result in increased maintenance costs, unless an adequate wearing surface is maintained. Roads should be located in the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage. Special design of roads is needed to overcome the slope limitation.

This soil is in capability subclass VIIs, nonirrigated.

381—Greenbrae fine sandy loam, 0 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray fine sandy loam about 7 inches thick. The subsoil is brown sandy clay loam about 23 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified gravelly fine sandy loam and sandy loam.

Included with this soil in mapping are about 5 percent Haybourne soils on the younger surfaces of alluvial fans (range site: 26-16) and 5 percent Brockliss Variant soils, drained, along drainageways (range site: 26-30).

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for irrigated crops and urban development.

The potential plant community on the Greenbrae soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately low average annual precipitation.

Areas of this soil are moderately limited for roads because of moderately low strength in the soil and moderate frost heave. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIe, irrigated, and VIs, nonirrigated. It is in range site 26-16.

382—Greenbrae gravelly fine sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown and pale brown gravelly fine sandy loam about 9 inches thick. The subsoil is brown sandy clay loam about 19 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified gravelly sandy loam and sandy loam.

Included with this soil in mapping is about 5 percent Haybourne soils on upper parts of the alluvial fans.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for irrigated crops and urban development.

The potential plant community on this Greenbrae soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation. Grazing needs to be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect this soil from excessive erosion. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately low average annual precipitation.

Areas of this soil are moderately limited for roads because of the moderately low strength and moderate frost heave. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIe, irrigated, and VIs, nonirrigated. It is in range site 26-16.

391—Haybourne sand, 0 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown sand about 10 inches thick. The subsoil is brown sandy loam about 19 inches thick. The substratum to a depth of 60 inches or more is stratified, pale brown sandy loam to coarse sand.

Included with this soil in mapping is about 5 percent Toll soils on stabilized sandy dunes (range site: 26-20).

Permeability of this Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing and wildlife habitat. Areas are suited to irrigated crops if irrigation water is made available.

The potential plant community on the Haybourne soil is mainly Wyoming big sagebrush, needleandthread, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderate available water capacity and moderately low average annual precipitation. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure, and grazing should be managed to protect the soil from excessive soil blowing. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the sandy surface layer.

Areas of this soil are limited for roads because of rare flooding and the moderate hazard of frost heave. Structures to protect this soil from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIs, irrigated, and VIIs, nonirrigated. It is in range site 26-20.

392—Haybourne loam, 0 to 2 percent slopes. This very deep, well drained soil is on smooth alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown and brown loam about 6 inches thick. Next is about 19 inches of brown sandy loam. The substratum to a depth of 60 inches or more is stratified, brown, pale brown, and light brownish gray loamy sand and coarse sand. Adjoining the Carson City area, the surface layer is sandy loam. In some areas, the surface layer is very stony, and the substratum is very gravelly.

Included with this soil in mapping is about 10 percent Toll soils on stabilized sand dunes (range site: 26-20).

Permeability of this Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding during prolonged, high-intensity storms.

Most areas of this soil are used for livestock grazing, urban development, and wildlife habitat. A few areas are used for irrigated crops.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation and moderate available water capacity. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately low average annual precipitation.

This soil is suited to irrigated crops. It is limited mainly by the moderate available water capacity. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling is needed for the efficient application and removal of irrigation water. Maintaining crop residue on the surface helps to maintain tilth and organic matter content. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are rare flooding, inadequate filtration of septic tank effluent, and unstable sidewalls of cutbanks. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping. The moderate to high density housing developments need community sewer systems to prevent contamination of water supplies as a result of seepage.

Areas of this soil are moderately limited for roads because of rare flooding and the moderate hazard of frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIs, irrigated, and VIs, nonirrigated. It is in range site 26-16.

393—Haybourne loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed

in alluvium derived from mixed sources of rock. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown loam about 6 inches thick. The subsoil is brown sandy loam about 19 inches thick. The substratum to a depth of 60 inches or more is stratified, brown and pale brown fine sandy loam to coarse sand. In some areas the surface layer is sandy loam.

Included with this soil in mapping adjoining the Carson City area are about 5 percent coarse-loamy, mixed, mesic Aridic Haploxerolls on moderately steep alluvial fans (range site: 26-16) and about 5 percent coarse-loamy, mixed, mesic Xeric Torriorthents on inset alluvial fans (range site: 26-20). The included soils make up about 10 percent of mapped areas.

Permeability of this Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this unit are used for livestock grazing, urban development, and wildlife habitat. Areas are suitable for irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderate available water capacity and moderately low average annual precipitation.

The main limitations for urban development are rare flooding, inadequate filtration of septic tank effluent, and unstable sidewalls of cutbanks. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Community sewer systems are needed in moderate to high density housing developments to prevent contamination of water supplies as a result of seepage.

Areas of this soil are limited for roads because of rare flooding and the moderate hazard of frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIe, irrigated, and VIs, nonirrigated. It is in range site 26-16.

394—Haybourne fine sandy loam, gravelly substratum, 0 to 2 percent slopes. This very deep, well drained soil is on inset alluvial fans along drainageways. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 4,700 to 5,100 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray fine sandy loam about 20 inches thick. The subsoil and upper part of the substratum are stratified, grayish brown loamy sand and fine sandy loam about 20 inches thick. The lower part of the substratum to a depth of 60 inches or more is stratified, light brownish gray cobbly sand and very gravelly fine sand. Depth to the gravelly and cobbly substratum ranges from 40 to 48 inches.

Included in this soil in mapping is about 10 percent extremely gravelly Torriorthents intermingled with the Haybourne soils on inset alluvial fans (range site: 26-16).

Permeability of this Haybourne soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding. Channeling and deposition are common along streambanks.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development. Areas are suitable for irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation and low available water capacity. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and inadequate filtration of septic tank effluent. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Because the substratum is rapidly permeable, special design for septic tank absorption fields is needed to avoid pollution of ground water or nearby water supplies.

Areas of this soil are limited for roads because of rare flooding and the moderate hazard of frost heaving. Flooding can be controlled by use of major flood control structures. Local roads and streets require a special base in some areas to avoid frost heave damage. Trafficability of roads can be improved by providing a

stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIs, irrigated, and VIIc, nonirrigated. It is in range site 26-16.

401—Heidtman clay loam. This very deep, somewhat poorly drained soil is on flood plains. It formed in alluvium derived from granite and a wide variety of rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 7 inches thick. The subsoil and upper part of the underlying material is grayish brown, stratified clay loam and loam about 40 inches thick. Below this to a depth of 60 inches or more is light brownish gray sand. In some areas the soil is slightly affected by salt and alkali.

Included with this soil in mapping is 5 percent areas of soils that are not flooded.

Permeability of this Heidtman soil is moderately slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. This soil is subject to occasional brief flooding in December through March. The subsoil and upper part of the underlying material are slightly affected by salt and alkali.

Areas of this soil are used for irrigated hay, pasture, and crops and for urban development and wildlife habitat.

This Heidtman soil is well suited to hay and pasture. The main limitations are the slight concentrations of salt and alkali in the upper part of the underlying material and the occasional flooding. To establish and maintain structures to protect this soil from flooding is difficult. Salt-tolerant grasses and legumes grow well if adequate nitrogen fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Leveling helps to insure the uniform application of water. Because of the water table, cuts required for leveling should be less than 18 inches deep.

This soil is suited to irrigated crops. It is limited mainly by occasional flooding and by slight concentrations of salt and alkali in the upper part of the underlying material. The water table that develops during the irrigation period generally limits the suitability of this soil for deep-rooted crops. Deep drainage of this soil is difficult because of low position and the lack of grade to an outlet. The content of salts and alkali can be reduced by soil amendments, such as gypsum, by leaching, and by carefully applying irrigation water. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are occasional flooding, a seasonal high water table, moderately slow permeability, and unstable sidewalls in cutbanks. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of occasional flooding, low strength in the soil, and severe frost heaving. Major flood control structures help control flooding. Roads are difficult to maintain because of the moderate content of clay that has low strength when wet. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads need surface drainage.

This soil is in capability subclass IIw, irrigated.

402—Heidtman clay loam, clay substratum. This very deep, somewhat poorly drained soil is on flood plains. It formed in alluvium derived dominantly from granite and a wide variety of rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 7 inches thick. The upper 33 inches of the underlying material is grayish brown, stratified clay loam and loam, and the lower part to a depth of 60 inches is light brownish gray clay.

Included with this soil in mapping east of Genoa is about 5 percent areas of soils that are strongly affected by salt and alkali.

Permeability of this Heidtman soil is moderately slow to a depth of 40 inches and slow below this depth. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 5 feet from December through May. Water is perched above the clay substratum during the irrigation season. This soil is subject to occasional brief flooding from December through March. The surface layer is slightly affected by salt and alkali.

Areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat.

This soil is well suited to crops, hay, and pasture. The main limitations are slow permeability of the underlying material, slight concentrations of salt and alkali in the upper part of the substratum, and occasional flooding. Flooding can damage irrigation structures and cause silting of ditches. Salt-tolerant grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil

is wet results in compaction of the surface layer, poor tilth, and low infiltration. Leveling helps to insure the uniform application of water. Because of the water table, cuts for leveling should be less than about 18 inches deep.

The content of salts and alkali in the surface layer of this soil can be reduced by soil amendments, such as gypsum, by leaching, and by carefully applying irrigation water. Deep drainage of this soil is difficult because of low position, the lack of grade to an outlet, and slow permeability. Border and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Irrigation water must be applied carefully to prevent a rise in the water table and an increase of salt and alkali. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond to nitrogen and phosphorous fertilizers.

Areas of this soil are limited for roads because of low strength of the soil, occasional flooding, and severe frost heave. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Flooding can be controlled by the use of major flood control structures. Local roads and streets in some areas require a special base to avoid frost heave damage. Roads need surface drainage.

This soil is in capability subclass IIw, irrigated.

411—Henningsen loam. This very deep, somewhat poorly drained soil is on low terraces and flood plains. It formed in alluvium derived dominantly from granite, but also from basalt, andesite, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 13 inches thick. The underlying material to a depth of 60 inches is grayish brown very gravelly loamy coarse sand and very gravelly coarse sand.

Included with this soil in mapping is about 5 percent areas of soils that are rarely flooded.

Permeability of this Henningsen soil is very rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December to May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding from December to March.

Areas of this soil are used for irrigated hay and pasture, urban development, and wildlife habitat. Areas are suitable for irrigated crops but are limited by low available water capacity.

This soil is suited to hay and pasture. Irrigation water can be applied by the border and corrugation methods. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Because of the limited depth to gravel and sand, cuts required for leveling should be less than 6 inches deep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are occasional flooding, a deep seasonal high water table, unstable sidewalls in cutbanks, and poor filtration of septic tank effluent. Drainage should be provided for buildings with basements and crawl spaces. Buildings need to be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness, and contamination of ground water by poorly filtered effluent is a hazard.

Areas of this soil are limited for roads because of occasional flooding. Major flood control structures help to control flooding.

This soil is in capability subclass IVw, irrigated.

412—Henningsen loam, wet. This very deep, somewhat poorly drained soil is on low lying terraces and flood plains. The drainage has been altered. This soil formed in alluvium derived dominantly from granite, but also from basalt, andesite, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 13 inches thick. The underlying material to a depth of 60 inches is grayish brown very gravelly loamy coarse sand and very gravelly coarse sand. In some areas near Minden and Gardnerville, the surface layer is gravelly clay loam.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Henningsen soil is very rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to frequent, brief flooding in December through March.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development. Irrigated areas are suitable for shallow-rooted crops.

This soil is suited to hay and pasture. The main limitation is low available water capacity. Irrigation water can be applied by the border and corrugation methods. Because this soil is droughty, and to prevent raising the moderately deep seasonal high water table, light and

frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Because of the limited depth to water and the gravelly substratum, cuts required for leveling should be less than 6 inches deep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are the moderately deep seasonal high water table, frequent flooding, unstable sidewalls in cutbanks, and poor filtration of septic tank effluent. Drainage should be provided for buildings with basements and crawl spaces. Buildings need to be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness. The poorly filtered effluent is a hazard for contamination of the ground water supply.

Areas of this soil are limited for roads because of frequent flooding. Flooding can be controlled by use of major flood control structures.

This soil is in capability subclass IVw, irrigated.

413—Henningsen gravelly loam. This very deep, somewhat poorly drained soil is on low terraces and flood plains. It formed in alluvium derived dominantly from granite but also from basalt, andesite, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown gravelly loam about 13 inches thick. The underlying material to a depth of 60 inches is grayish brown very gravelly loamy coarse sand and extremely gravelly coarse sand.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Henningsen soil is very rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March.

Areas of this soil are used for irrigated hay and pasture, urban development, and wildlife habitat. Areas are suitable for irrigated crops but are limited by the low available water capacity.

This soil is suited to hay and pasture. The main limitation is the low available water capacity. Irrigation water can be applied by the border and corrugation methods. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Because of the shallow depth to gravel and sand, cuts required for leveling should be less than 6 inches deep. Grazing needs to be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are occasional flooding, a deep water table, unstable sidewalls in cutbanks, and poor filtration of septic tank effluent. Drainage should be provided for buildings with basements and crawl spaces. Buildings need to be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness. The poorly filtered effluent is a hazard for contamination of the ground water supply.

Areas of this soil are limited for roads because of occasional flooding. Flooding can be controlled by use of major flood control structures.

This soil is in capability subclass IVw, irrigated.

414—Henningsen gravelly loam, wet. This very deep, somewhat poorly drained soil is on low lying river terraces and flood plains. The drainage has been altered. This soil formed in alluvium derived dominantly from granite but also from basalt, andesite, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,900 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown gravelly loam about 13 inches thick. The underlying material to a depth of 60 inches is grayish brown very gravelly loamy coarse sand and very gravelly coarse sand.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Henningsen soil is very rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to frequent, brief flooding in December through March.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development. Irrigated areas are suitable for shallow-rooted crops.

This soil is suited to hay and pasture. The main limitations are the frequent flooding, a moderately deep seasonal high water table, and low available water capacity. Irrigation water can be applied by the border and corrugation methods. Because this soil is droughty and to prevent raising the moderately deep water table, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Because of moderate depth to the water table

and sandy and gravelly substratum, cuts required for leveling should be less than 6 inches. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Annual applications of nigtrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are the moderately deep seasonal high water table, frequent flooding, unstable sidewalls of cutbanks, and poor filtration of septic tank effluent. Drainage should be provided for buildings with basements and crawl spaces. Buildings need to be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness. The poorly filtered septic tank effluent is a hazard for contamination of the ground water supply.

Areas of this soil are limited for roads because of frequent flooding. Flooding can be controlled by use of major flood control structures.

This soil is in capability subclass IVw, irrigated.

422—Henningsen Variant loam. This very deep, somewhat poorly drained soil is on smooth, low river terraces. It formed in alluvium derived dominantly from granite but partly from basalt, andesite, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown and dark grayish brown loam about 9 inches thick. The upper 19 inches of the underlying material is grayish brown fine sandy loam, and the lower part to a depth of 60 inches is grayish brown very gravelly loamy coarse sand. In some areas the surface layer is clay loam.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Henningsen Variant soil is moderately rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development. Irrigated areas are suitable for shallow-rooted crops, but are limited by the low available water capacity and occasional flooding.

This soil is suited to hay and pasture. The main limitation is occasional flooding and low available water capacity. Irrigation water can be applied by the border and corrugation methods. Leveling helps to insure the uniform application of water. Because of the depth to the water table and to gravel and sand, cuts required for leveling should be less than 12 inches deep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are a deep water table, occasional flooding, instability of cutbanks, and poor filtration of septic tank effluent. Drainage should be provided if buildings with basements and crawl spaces are constructed. Buildings need to be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness, and the poorly filtered effluent is a contamination hazard to the ground water supply.

Areas of this soil are limited for roads because of the occasional flooding and severe frost heave. Flooding can be controlled by use of major flood control structures. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIw, irrigated.

431—Shalcar family peat. This very deep, very poorly drained soil is on nearly level and concave basin floors. It formed in organic litter from sedges and rushes over moderately fine textured alluvium. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface tier is very dark gray peat about 6 inches thick. The next tier is stratified, gray muck and silt loam about 18 inches thick. The upper 6 inches of the underlying material is light gray sandy clay loam, and the lower part to a depth of 60 inches is light gray gravelly loamy coarse sand.

Included with this soil in mapping is about 10 percent areas of James Canyon soils on slightly convex basin floors.

Permeability of this Shalcar family peat soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that ranges from 2 feet above the surface to a depth of 1.5 feet from January through December. Runoff is ponded, and the hazards of water erosion and soil blowing are slight. This soil is subject to frequent, long flooding in December through March.

Areas of this soil are used for hay and pasture and wildlife habitat.

This soil is suited to hay and pasture. The main limitations are ponding, the seasonal high water table, and frequent flooding. Wetness limits the choice of plants, limits the period of cutting or grazing, and

increases the risk of winterkill. Tile drainage can be used to lower the water table if a suitable outlet is available. The use of equipment is limited by ponding or the seasonal high water table. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. The amount of molybdenum in the forage produced on this soil is sufficient to be toxic to livestock, although it does not affect productivity.

Areas of this soil are limited for roads because of ponding in spring, the seasonal high water table in summer and winter, and frequent flooding. Roads are difficult to maintain because of the presence of peat and muck, which have low strength. Drainage is difficult because of the low position of this soil and the lack of grade to an outlet. Roads and streets should be located above the expected flood level. Special design is needed to overcome the limitation imposed by the high water table.

This soil is in capability subclass Vw, irrigated.

442—Holbrook gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray gravelly fine sandy loam about 15 inches thick. The underlying material to a depth of 60 inches is light brownish gray very gravelly sandy loam.

Included with this soil in mapping is 10 percent Brockliss Variant soils on toe slopes (range site: 26-3).

Permeability of this Holbrook soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing, irrigated crops, urban development, and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately high average annual precipitation and low available water capacity. In some areas this soil contains sufficient molybdenum to cause toxic accumulations in forage.

This soil is suited to irrigated crops. It is limited mainly by the low available water capacity and moderate slopes. Because this soil is droughty, light and frequent applications of irrigation water are needed. Most climatically adapted crops can be grown. Sprinkler irrigation is more suitable than most other methods. Sprinklers permit the even, controlled application of water and reduce runoff. If furrow or corrugation irrigation methods are used, runs should be on the contour or across the slope. Pipe, ditch lining, or drop structures need to be installed in irrigation ditches to facilitate irrigation and prevent excessive ditch erosion. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. All tillage should be on the contour or across the slope. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are rare flooding and unstable sidewalls in cutbanks. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of rare flooding and moderate frost heaving. Structures to protect this soil from flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base to avoid frost heave damage. Roads require surface drainage.

This soil is in capability subclass IVe, irrigated, and VIs, nonirrigated. It is in range site 26-10.

443—Holbrook very stony sandy loam, 4 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with 3 to 15 percent stones. The surface layer is gray very stony sandy loam about 7 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified stony sand to extremely gravelly loam.

Included with this soil in mapping is about 5 percent Mottsville soils on inset alluvial fans (range site: 26-8).

Permeability of this Holbrook soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The

production of vegetation suitable for livestock grazing is limited by the very low available water capacity. Use of machinery is not practical because of the very stony surface. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is poor. The main limitation is the very low available water capacity.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and strong slopes. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping. Steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour.

Areas of this soil are limited for roads because of the strong slopes, moderate frost heaving, and rare flooding. Structures to protect the soils from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

444—Holbrook-Glenbrook association. This association is on alluvial fans and low hills. Slope is 4 to 30 percent. Elevation is 5,200 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 90 days.

This association is 55 percent Holbrook gravelly fine sandy loam, 4 to 15 percent slopes, and 30 percent Glenbrook sand, 8 to 30 percent slopes. The Holbrook soil is on alluvial fans, and the Glenbrook soil is on hills. These soils are at a higher elevation and normally colder than the soils in their series.

Included with these soils in mapping are about 10 percent Saralegui soils on the older fan remnants (range site: 26-10) and 5 percent Mottsville soils on inset alluvial fans (range site: 26-8). The included soils make up about 15 percent of mapped areas.

The Holbrook soil is very deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface layer is grayish brown gravelly fine sandy loam about 7 inches thick. The underlying material to a depth of 60 inches is stratified, grayish brown, brown, and pale brown stony sand to extremely gravelly loam.

Permeability of the Holbrook soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Glenbrook soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown sand about 9 inches thick. The underlying material to a depth of 19 inches is grayish brown gravelly loamy coarse sand. Soft weathered granite bedrock is at a depth of 19 inches.

Permeability of the Glenbrook soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Holbrook soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the low available water capacity and moderate average annual precipitation.

The potential plant community on the Glenbrook soil is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, desert needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very low available water capacity.

Seeding large areas of the Holbrook soil is difficult. This is because of the pattern in which this soil occurs with the Glenbrook soil. Livestock grazing should be managed to prevent overuse of the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Glenbrook soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the steep slopes on the Glenbrook soil. Strong slopes and rare flooding are moderate limitations in some areas. Moderate frost heaving is a limitation on the Holbrook soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Glenbrook soil. Local roads and streets in some areas of the Holbrook soil require a special base to avoid frost heave damage. Structures to protect the Holbrook soil from flash flooding are difficult to establish and maintain. Cutting and filling can be reduced by building roads in less sloping areas. Roads should be provided with adequate

surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Holbrook soil is in capability subclass VIs, nonirrigated, and range site 26-10. The Glenbrook soil is in capability subclass VIIs, nonirrigated, and range site 26-18.

445—Holbrook-Greenbrae-Reno association. This association is on alluvial fans and terraces. Slope is 4 to 15 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Holbrook extremely stony sandy loam, 8 to 15 percent slopes, 25 percent Greenbrae gravelly sandy loam, 8 to 15 percent slopes, and 15 percent Reno cobbly sandy loam, 4 to 15 percent slopes. The Holbrook soil is on alluvial fans adjacent to the mountains, the Greenbrae soil is on piedmont fan remnants, and the Reno soil is on terraces.

Included with these soils in mapping are about 2 percent Toll sandy soils that are on alluvial fans and intermingled with the Holbrook soils (range site: 26-20); 2 percent Phing soils that are on terraces with the Reno soils but do not have a duripan (range site: 26-25); and 6 percent Veta soils on inset alluvial fans (range site: 26-34). The included soils make up about 10 percent of mapped areas.

The Holbrook soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony sandy loam about 14 inches thick. The underlying material to a depth of 60 inches is stratified, pale brown and light brownish gray stony sand to extremely gravelly loam. In some areas the surface layer is very gravelly.

Permeability of the Holbrook soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Greenbrae soil is very deep and well drained. It formed in alluvium derived from many kinds of rock. Typically, the surface layer is grayish brown and light brownish gray gravelly sandy loam about 8 inches thick. The subsoil is grayish brown sandy clay loam about 16 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified coarse sand to gravelly loam. In some areas the slope is 4 to 8 percent.

Permeability of the Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 5 to 10 percent cobbles. The surface layer is light brownish gray cobbly sandy loam about 4 inches thick. The subsoil is dark brown clay about 34 inches thick. Below this to a depth of 60 inches or more is a pale brown indurated hardpan.

Permeability of the Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Holbrook soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the extremely stony surface and very low available water capacity in the surface layer.

The potential plant community on the Greenbrae soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for rangeland seeding are moderately low average annual precipitation and moderately low available water capacity in the surface layer.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer abruptly underlain by very slowly permeable clayey subsoil.

Seeding large areas of the Greenbrae soil is difficult. This is because of the pattern in which the Greenbrae soil occurs with the Holbrook and Reno soils. Because of the moderately low annual precipitation on the Greenbrae and Reno soils and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer of the Reno soil results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Grazing should be delayed until the soils are firm and the more desirable

forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of highly expandable clay with low strength in the Greenbrae and Reno soils. Strong slopes and rare flooding on the Holbrook soil and moderate frost heave on the Holbrook and Greenbrae soils are moderate limitations. Structures to protect the Holbrook soil from flash flooding are difficult to establish and maintain. In some areas, local roads and streets require a special base to avoid frost heave damage and to overcome the hazards of low strength and highly expandable clay. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Holbrook soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Greenbrae soil is in capability subclass VIs, nonirrigated, and range site 26-16. The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25.

446—Holbrook-Verdico association. This association is on alluvial fans and old terraces. Slope is 2 to 15 percent. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Holbrook extremely stony coarse sandy loam, 4 to 15 percent slopes, and 40 percent Verdico clay loam, 2 to 8 percent slopes. The Holbrook soil is on alluvial fans adjacent to the mountains, and the Verdico soil is on old terraces.

Included with these soils in mapping are about 5 percent Springmeyer soils that are on older fan remnant surfaces and intermingled with the Holbrook soils (range site: 26-10), 5 percent Brockliss Variant soils on drainageways (range site: 26-3), and 5 percent Chalco soils on side slopes of terraces (range site: 26-29). The included soils make up about 15 percent of mapped areas.

The Holbrook soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony coarse sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified extremely gravelly sandy loam to stony sand.

Permeability of the Holbrook soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Verdico soil is moderately deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is grayish brown clay loam about 2 inches thick. The subsoil is pale brown clay about 28 inches thick. Tertiary mudstone is at a depth of 30 inches.

Permeability of the Verdico soil is very slow. Available water capacity is moderate. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Most areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Holbrook soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation is the extremely stony surface and very low available water capacity of the surface layer.

The potential plant community on the Verdico soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Canby bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer abruptly underlain by very slowly permeable clayey subsoil.

Because of the thin surface layer of the Verdico soil and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer of the Verdico soil results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the highly expandable clay with low strength in the Verdico soil. Strong slopes, rare flooding, and frost heave are moderate limitations on the Holbrook soil. In some areas, local roads and streets require a special base to avoid frost heave damage and the hazards of low strength and highly expandable clay. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Holbrook soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Verdico soil is in

capability subclass VIIs, nonirrigated, and range site 26-23.

451—Hyloc-Ister association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 47 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Hyloc very cobbly sandy loam, 15 to 30 percent slopes, and 40 percent Ister extremely stony sandy loam, 30 to 50 percent slopes. The Hyloc soil is on south- and west-facing convex side slopes, and the Ister soil is on north- and east-facing side slopes.

Included with these soils in mapping are about 10 percent Cagle soils on concave south-facing side slopes (woodland site: Pinyon-juniper woodland), 3 percent Verdico soils on ridges (range site: 26-23), and 2 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Hyloc soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 10 to 20 percent cobbles. The surface layer is brown very cobbly sandy loam about 9 inches thick. The subsoil is brown and light brown gravelly clay about 10 inches thick. Weathered bedrock is at a depth of 19 inches.

Permeability of the Hyloc soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Ister soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony sandy loam about 16 inches thick. The subsoil is yellowish brown very stony clay loam about 21 inches thick. Andesitic bedrock is at a depth of 37 inches.

Permeability of the Ister soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Hyloc soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 3 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity and shallow depth to bedrock. Minimizing the risk of erosion is essential in harvesting. The young trees can be cut for use as Christmas trees. Very low available water capacity and plant competition delay natural regeneration but do not prevent the eventual development of a fully stocked, normal stand of trees. Conventional methods of harvesting generally are suitable, but heavy equipment can compact the soil if it is wet.

The potential plant community on the Ister soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes, the extremely stony surface, and low available water capacity in the surface layer. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressures. Livestock grazing should be managed to protect the soil from excessive erosion. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plants in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes and the presence of highly expandable clay in the Hyloc soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Hyloc soil.

Roads on the Hyloc soil are difficult to maintain because of the clay subsoil, which has low strength when wet. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Hyloc soil is in capability subclass VIIe, nonirrigated. The Ister soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

461—Hussman silty clay loam. This very deep, somewhat poorly drained soil is on terraces. It formed in alluvium derived dominantly from granite, but partly from rhyolite, basalt, and sedimentary and metamorphic rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown silty clay loam about 12 inches thick. The underlying material to a depth of 60 inches is stratified, light brownish gray and grayish brown silty clay loam and clay. In some areas the surface layer is clay.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Hussman soil is slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2.5 to 4.0 feet from December through May. This soil is subject to occasional brief flooding from December through March. It is slightly affected by salt and alkali to a depth of 60 inches.

Areas of this soil are used for irrigated hay, pasture, and crops and for urban development and wildlife habitat.

This soil is well suited to hay and pasture. The main limitation is occasional flooding. Wetness limits the choice of plants and the period of cutting or grazing. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Leveling helps to insure the uniform application of water. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

This soil is suited to irrigated crops. It is limited mainly by the deep seasonal high water table, slow permeability, and occasional flooding. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Because of the slow permeability of this soil the application of water should be regulated so that water does not stand on the surface and damage the crops. Crusting of the surface and compaction can be reduced by returning crop residue to the soil.

The main limitations for urban development are the occasional flooding, highly expandable clays, a deep seasonal high water table, and slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and slow permeability. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling.

Areas of this soil are limited for roads because of occasional flooding, severe frost heaving, and presence of highly expandable clay. Flooding can be controlled by use of major flood control structures. Roads are difficult to maintain because of the clay, which has low strength when wet. In some areas, local roads and streets require a special base to avoid frost heave damage and the effects of shrinking and swelling. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

462—Hussman clay loam, strongly saline-alkali. This very deep, somewhat poorly drained soil is on terraces. It formed in alluvium derived dominantly from granite, but partly from rhyolite, basalt, and metamorphic and sedimentary rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown clay loam about 10 inches thick. The underlying material to a depth of 60 inches is stratified, light brownish gray and grayish brown silty clay loam and clay.

Included with this soil in mapping is about 5 percent areas of soils that are occasionally or frequently flooded.

Permeability of this Hussman soil is slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2.5 to 4.0 feet from December through May. This soil is subject to rare flooding. The surface layer is strongly affected by salt and alkali, and soil below the surface layer is slightly affected.

Areas of this soil are used for irrigated hay and pasture, urban development, and wildlife habitat.

This Hussman soil is poorly suited to hay and pasture. The main limitations are slow permeability and the strongly saline-alkali condition in the surface layer. Intensive management is required to reduce the salinity and maintain soil productivity. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the slow permeability and moderately deep water table. Salt-tolerant species are more suited to planting than most other species. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Irrigation water can be applied by the border and corrugation methods. Leveling helps to insure the uniform application of water. Because of the limited depth to the water table, cuts required for leveling should be less than 12 inches deep.

The main limitations for urban development are the rare flooding, highly expandable clay, a moderately deep seasonal high water table, and slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and slow permeability. Buildings can be designed to offset the effects of shrinking and swelling. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

Areas of this soil are limited for roads because of low strength, severe frost heaving, and highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. In some areas, local

roads and streets require a special base to avoid effects of shrinking and swelling and frost heave damage.

This soil is in capability subclass VIw, irrigated.

463—Hussman clay. This very deep, somewhat poorly drained soil is on terraces. It formed in alluvium derived dominantly from granite but partly from rhyolite, basalt, and metamorphic and sedimentary rocks. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 9 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 110 days.

Typically, the surface layer is grayish brown clay about 12 inches thick. The underlying material to a depth of 60 inches is stratified, brown, light brownish gray, and grayish brown silty clay loam and silty clay.

Included with this soil in mapping is about 7 percent areas of soils that are occasionally flooded.

Permeability of this Hussman soil is slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2.5 to 4 feet from December through May. This soil is subject to rare flooding during prolonged, high-intensity storms.

Areas of this soil are used for hay, pasture, crops, and for wildlife habitat. Some areas are used for urban development.

This soil is suited to hay, pasture, and crops. The main limitations are the deep seasonal high water table and slow permeability. Wetness limits the choice of plants and the period of harvest or grazing. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Leveling helps to insure the uniform application of water. Because of the seasonal high water table, cuts required for leveling should be less than 12 inches deep.

Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Because of the slow permeability of this soil the application of water should be regulated so that water does not stand on the surface and damage the crops. Irrigation water must be carefully applied to avoid raising the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are the deep seasonal high water table, slow permeability, rare flooding, and highly expandable clay. Rare flooding can be controlled by use of major flood control structures. Buildings should be designed to offset the limited ability of the soil to support a load and the effects of shrinking and swelling. Septic tank absorption fields do not function properly because of wetness and slow permeability.

Areas of this soil are limited for roads because of low strength, the presence of highly expandable clay, and severe frost heaving. Roads are difficult to maintain because of the clay, which has low strength when wet. In some areas, local roads and streets require a special base to avoid frost heave damage and the effects of shrinking and swelling. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

471—Incy fine sand, 4 to 30 percent slopes. This very deep, excessively drained soil is on dunes. It formed in eolian deposits derived dominantly from granitic rocks. Elevation is 4,600 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual air temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown fine sand about 4 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray fine sand.

Included with this soil in mapping is about 10 percent Toll soils on alluvial fans (range site: 26-20).

Permeability of this Incy soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. Areas are also used for urban development.

The potential plant community on this soil is mainly antelope bitterbrush, Anderson peachbrush, needleandthread, and Indian ricegrass. The present vegetation in most areas is mainly antelope bitterbrush, green ephedra, desert needlegrass, and Anderson peachbrush. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the sandy surface. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Grazing should be managed to protect this soil from excessive soil blowing.

The main limitations for urban development are moderately steep slopes, unstable sidewalls in cutbanks, and inadequate filtration of septic tank effluent. Excavation for houses and access roads exposes material that is highly susceptible to soil blowing. Preserving the existing plant cover and revegetating disturbed areas around construction sites as soon as possible help to control soil blowing. Plans for homesite development should provide for the preservation of as many shrubs as possible. Cutbanks are not stable and are subject to slumping. Housing developments of moderate to high density need community sewer

systems to prevent contamination of water supplies as a result of seepage.

Areas of this soil are limited for roads because of the moderately steep slopes in some areas. Construction and maintenance costs can be reduced by locating roads in the less sloping areas. During prolonged dry periods, roads are difficult to maintain because of loose sand, which results in poor traction and increased risk of soil blowing.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-14.

481—Indian Creek sandy loam, 0 to 4 percent slopes. This shallow, well drained soil is on old alluvial fans and terraces. It formed in alluvium derived from mixed sources of rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil is dark brown clay about 12 inches thick. Below this is an indurated, silica-cemented hardpan about 12 inches thick. The substratum to a depth of 60 inches or more is light brownish gray, stratified extremely gravelly sandy loam and gravelly loamy sand. In places it is thin, lenticular layers of hardpan.

Included with this soil in mapping is about 5 percent Haybourne fine sandy loam, gravelly substratum, 0 to 2 percent slopes, on inset alluvial fans (range site: 26-16).

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are mainly used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation, shallow rooting depth, and very low available water capacity. Because of very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The main limitations for urban development are shallow depth to the hardpan, very slow permeability, highly expandable clay, and unstable sidewalls in cutbanks below the hardpan. Heavy equipment is needed for excavation. Footings should be placed on or below the hardpan to overcome the limitations of high shrink-swell potential and low strength. Septic tank filter fields require special design to overcome the limitations of shallow depth and the very slowly permeable subsoil. The suitability of this soil for septic tank absorption fields can be improved by ripping the hardpan with heavy equipment to increase permeability.

Areas of this soil are limited for roads because of the clayey subsoil and shallow depth to the hardpan. Deep cuts should be avoided because of the hardpan. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Roads need to be designed to provide surface drainage, a stable base, and an adequate wearing surface to improve trafficability.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

482—Indian Creek gravelly fine sandy loam, 4 to 15 percent slopes. This shallow, well drained soil is on terraces. It formed in alluvium derived from mixed sources of rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray gravelly fine sandy loam about 5 inches thick. The subsoil is dark brown clay about 14 inches thick. Below this is an indurated, silica-cemented hardpan about 5 inches thick. The substratum to a depth of 60 inches or more is stratified, light gray and light brownish gray very gravelly loamy coarse sand and very gravelly coarse sandy loam. In some areas the surface layer is very cobbly.

Included with this soil in mapping are about 3 percent Haybourne soils on inset alluvial fans (range site: 26-16) and 2 percent Chalco soils on terrace breaks (range site: 26-29). The included soils make up about 5 percent of mapped areas.

Permeability of this Indian Creek soil is very slow above the hardpan. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing, wildlife habitat, and urban development.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. Because of very low available water capacity and the competition

from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very low available water capacity.

The main limitations for urban development are shallow depth to the hardpan, very slow permeability, highly expandable clay, and unstable sidewalls in cutbanks below the hardpan. Heavy equipment is needed for excavation. Footings should be placed on or below the hardpan to overcome the limitations of high shrink-swell potential and low strength. Septic tank filter fields require special design to overcome the limitations of slope, shallow depth, and the very slow permeability in the subsoil. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan with heavy equipment to increase permeability. Absorption lines should be installed on the contour.

Areas of this soil are limited for roads because of the clayey subsoil and shallow depth to the hardpan. Deep cuts should be avoided because of the underlying hardpan. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Roads need to be designed to provide surface drainage, a stable base, and an adequate wearing surface to improve trafficability.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

483—Indian Creek very cobbly loam, 2 to 8 percent slopes. This shallow, well drained soil is on terraces. It formed in alluvium derived from mixed sources of rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray very cobbly loam about 3 inches thick. The subsoil is dark brown gravelly clay about 17 inches thick. Below this is an indurated, silica-cemented hardpan about 5 inches thick. The substratum to a depth of 60 inches or more is stratified, light gray and light brownish gray extremely gravelly loamy coarse sand and extremely gravelly coarse sandy loam.

Included with this soil in mapping is about 5 percent Chalco soils on terrace breaks (range site: 26-29).

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are mainly used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation, shallow rooting depth, and very low available water capacity. Because of very low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The main limitations for urban development are shallow depth to the hardpan, very slow permeability, highly expandable clay, and unstable sidewalls in cutbanks below the hardpan. Heavy equipment is needed for excavation. Footings should be placed on or below the hardpan to overcome the limitations of high shrink-swell potential and low strength. Septic tank filter fields require special design to overcome the limitation of the shallow, very slowly permeable subsoil. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan with heavy equipment to increase permeability.

Areas of this soil are limited for roads because of the clayey subsoil and shallow depth to the hardpan. Deep cuts should be avoided because of the hardpan. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Roads need to be designed to provide surface drainage, a stable base, and an adequate wearing surface to improve trafficability.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

485—Indian Creek-Haybourne association. This association is on old terraces and alluvial fans. Slope is 0 to 8 percent. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Indian Creek very cobbly loam, 2 to 8 percent slopes, and 25 percent Haybourne gravelly sandy loam, 0 to 4 percent slopes. The Indian Creek soil is on terraces, and the Haybourne soil is on inset fans.

Included with these soils in mapping are about 10 percent Reno soils on the highest, oldest terrace

remnants (range site: 26-25) and 5 percent Nevador soils on remnant alluvial fans below the Indian Creek soils (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Indian Creek soil is shallow and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown and light brownish gray very cobbly loam about 4 inches thick. The subsoil is brown clay about 12 inches thick. Below this to a depth of 20 inches is an indurated hardpan. The substratum to a depth of 60 inches or more is gray gravelly loamy sand.

Permeability of the Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Haybourne soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is light brownish gray gravelly sandy loam about 5 inches thick. The subsoil is pale brown sandy loam about 15 inches thick. The substratum to a depth of 60 inches or more is stratified, very pale brown fine sandy loam and gravelly sandy loam.

Permeability of the Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Indian Creek soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Haybourne soil is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low average annual precipitation and moderate available water capacity.

Seeding small areas of the Haybourne soil is difficult. This is because of the pattern in which this soil occurs with the Indian Creek soil. Because of moderately low average annual precipitation and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer of the Indian Creek soil results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of shallow depth to the hardpan and highly expandable clay in the Indian Creek soil. Deep cuts should be avoided on the Indian Creek soil because of the hardpan. Cutting and filling can be reduced by building roads in the less sloping areas. Roads need adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The Indian Creek soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Haybourne soil is in capability subclass VIs, nonirrigated, and range site 26-16.

486—Indian Creek-Reno-Cassiro association. This association is on dissected terraces and side slopes. Slope is 2 to 30 percent. Elevation is 5,200 to 5,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the frost-free period is about 100 days.

This association is 40 percent Indian Creek very cobbly loam, 2 to 8 percent slopes, 30 percent Reno very cobbly loam, 2 to 8 percent slopes, and 15 percent Cassiro extremely stony loam, 15 to 30 percent slopes. The Indian Creek soil is on upper terrace tops and shoulders, the Reno soil is on lower terraces and toe slopes, and the Cassiro soil is on steep terrace side slopes.

Included with these soils in mapping are about 2 percent Duco soils that are shallow to bedrock on hillslopes adjacent to the terraces (woodland site: Pinyon-juniper woodland), 5 percent Phing soils intermingled with the Cassiro soil on terrace slopes (range site: 26-25), 5 percent Springmeyer soils on higher inset alluvial fans (range site: 26-10), and 3 percent Haybourne soils on lower inset alluvial fans (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Indian Creek soil is shallow and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is gray and brown very cobbly loam about 3 inches thick. The subsoil is brown gravelly clay about 17 inches thick. Below this is an indurated, silica-cemented hardpan about 5 inches thick. The substratum to a depth of 60 inches or more is light gray, stratified extremely gravelly loamy coarse sand and extremely gravelly coarse sandy loam.

Permeability of the Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is light brownish gray very cobbly loam about 3 inches thick. The subsoil is brown clay about 19 inches thick. Below this is an indurated, silica-cemented hardpan about 10 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly sand.

Permeability of the Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Cassiro soil is very deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 5 inches thick. The subsoil is about 36 inches thick. It averages dark brown and yellowish brown extremely gravelly clay and very gravelly clay. The substratum to a depth of 60 inches or more is light yellowish brown gravelly sandy loam.

Permeability of the Cassiro soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Indian Creek soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation, shallow rooting depth, and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer abruptly underlain by the very slowly permeable clayey subsoil.

The potential plant community on the Cassiro soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity in the surface layer.

Livestock grazing should be managed to prevent overgrazing in the less sloping areas of the Indian Creek and Reno soils. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of highly expandable clay in the Reno soil, shallow depth to hardpan in the Indian Creek soil, and moderately steep slopes in the Cassiro soil. Roads on the Reno soil are difficult to maintain because of the clay, which has low strength when wet. Because of the underlying hardpan, deep cuts should be avoided, especially on the Indian Creek soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Trafficability of roads can be improved by providing a stable base.

The Indian Creek soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Cassiro soil is in capability subclass VIIs, nonirrigated, and range site 26-10.

487—Indian Creek Variant-Cassiro-Puett association. This association is on severely dissected old terraces and hills. Slope is 15 to 50 percent. Elevation is 5,100 to 5,600 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 45 percent Indian Creek Variant very gravelly loam, 15 to 50 percent slopes, 20 percent Cassiro extremely stony loam, 15 to 30 percent slopes, and 20 percent Puett gravelly fine sandy loam, 15 to 30 percent slopes. The Indian Creek Variant soil is on north- and east-facing dissected terrace side slopes, the Cassiro soil is on south- and west-facing dissected terrace side slopes, and the Puett soil is on eroded crests and severely eroded side slopes of hills above the terraces.

Included with these soils in mapping are about 3 percent Koontz soils on crests of ridges (range site: 26-15), 3 percent Phing soils on terrace toe slopes (range site: 26-25), 2 percent Springmeyer soils along drainageways (range site: 26-10), 1 percent Rock outcrop associated with the Puett soil, and 6 percent Indian Creek soils on terrace summits (range site: 26-25). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Indian Creek Variant soil is shallow and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface layer is light brownish gray very gravelly loam about 3 inches thick. The subsoil is dark grayish brown very gravelly clay loam and very gravelly sandy clay loam about 15 inches thick. Below this is an indurated, silica-cemented hardpan about 21 inches thick. The substratum to a depth of 60 inches or more is light gray very gravelly loamy sand.

Permeability of the Indian Creek Variant soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 12 to 18 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Cassiro soil is very deep and well drained. It formed in very gravelly alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 6 inches thick. The subsoil is yellowish brown very gravelly clay about 34 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Permeability of the Cassiro soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray gravelly fine sandy loam about 3 inches thick. The underlying material to a depth of 13 inches is pale brown fine sandy loam. Tertiary mudstone is at a depth of 13 inches. In some areas, slope is 30 to 50 percent.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Indian Creek Variant soil is mainly Wyoming big sagebrush, antelope bitterbrush, basin wildrye, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail, with invasion by pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes.

The potential plant community on the Cassiro soil is mainly Wyoming big sagebrush, antelope bitterbrush, basin wildrye, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity in the surface layer and the extremely stony surface.

The potential plant community of the Puett soil is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, purple sage, and desert needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

Steepness of slope in areas of this association limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Because of the low and very low available water capacity and the competition from pinyon, juniper, and sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in some areas, the soils can be managed for woodland.

Areas of this association are limited for roads because of moderately steep and steep slopes and shallow depth to an indurated hardpan in the Indian Creek Variant soil. Because of the underlying hardpan and bedrock, deep cuts should be avoided, especially on the Indian Creek Variant and Puett soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed. Local roads and streets require a special base in some areas to avoid moderate frost heave damage on

the Indian Creek Variant and Puett soils. Unless an adequate wearing surface is maintained, stones and cobbles in the Cassiro soil are road hazards and result in increased maintenance cost.

The Indian Creek Variant soil is in capability subclass VIIe, nonirrigated, and range site 26-10. The Cassiro soil is in capability subclass VIs, nonirrigated, and range site 26-10. The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29.

488—Indian Creek Variant-Roloc association. This association is on rounded hills. Slope is 30 to 50 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 55 percent Indian Creek Variant very stony loam, 30 to 50 percent slopes, and 30 percent Roloc stony sandy loam, 30 to 50 percent slopes. The Indian Creek Variant soil is on foot slopes, and the Roloc soil is on side slopes and ridges.

Included with these soils in mapping are about 5 percent Springmeyer soils on inset alluvial fans on the lower part of the unit (range site: 26-10), 5 percent Shree soils on upper alluvial fans (range site: 26-10), and 5 percent coarse-loamy, mixed, mesic Aridic Haploxerolls on north-facing toe slopes (range site: 26-5). The included soils make up about 15 percent of mapped areas.

The Indian Creek Variant soil is shallow and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with about 3 to 15 percent stones. The surface layer is grayish brown and light brownish gray very stony loam about 3 inches thick. The subsoil is brown very gravelly clay loam about 12 inches thick. Below this is an indurated hardpan about 20 inches thick. The substratum to a depth of 60 inches or more is light gray very gravelly sand and loamy sand.

Permeability of the Indian Creek Variant soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 12 to 18 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony sandy loam about 5 inches thick. The subsoil is brown very gravelly coarse sandy loam about 12 inches thick. Soft granite bedrock is at a depth of 17 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Indian Creek Variant soil is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the steep slopes and very low available water capacity.

The potential plant community on the Roloc soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the steep slopes and very low available water capacity.

Machinery is not practical in range management because the surface is stony and the slopes are steep. Slope limits access by livestock and results in overgrazing of the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing. Livestock grazing should be managed to protect the soils from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes and shallow depth to hardpan or bedrock. Because of the underlying hardpan and bedrock, deep cuts should be avoided. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards. These hazards result in increased maintenance cost. Local roads and streets require a special base in some areas to avoid moderate frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base.

The Indian Creek Variant soil is in capability subclass VIIe, nonirrigated, and range site 26-10. The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-46.

491—Indiano stony fine sandy loam, 30 to 50 percent slopes. This moderately deep, well drained soil is on rounded foothills. It formed in colluvium derived dominantly from rhyolite. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is covered with about 2 percent stones. The surface layer is brown stony fine sandy loam about 13 inches thick. The upper 11 inches of the subsoil is light yellowish brown gravelly clay loam, and the lower 9 inches is pale brown loam. The subsoil averages clay loam. Rhyolitic bedrock is at a depth of 31 inches. In some areas the surface layer is very stony.

Included with this soil in mapping is about 5 percent Indiano soils that have slopes of 4 to 30 percent (range site: 26-10).

Permeability of this Indiano soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the lack of a seed source and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Steepness of slope limits access and movement of livestock. Grazing should be managed to protect this soil from excessive erosion and to prevent overgrazing in the less sloping areas. If livestock are restricted to this soil, they tend to graze the ridgetops and valleys, leaving the slopes essentially ungrazed.

Areas of this soil are limited for roads because of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

501—James Canyon loam, drained, 2 to 4 percent slopes. This very deep, poorly drained soil is on slightly convex alluvial fans. The drainage is altered. This soil formed in alluvium derived from mixed sources of rock. Elevation is 4,700 to 4,900 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 31 inches thick. The underlying material to a depth of 60 inches is grayish brown and light brownish gray gravelly loam. In some areas the surface layer is gravelly.

Included with this soil in mapping is about 10 percent soils in depressional areas in which the water table is at a depth of 2 to 3 feet.

Permeability of this James Canyon soil is moderate. Available water capacity is high. Runoff is slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 6 feet from December through May. The deep water table is the result of changes in the original course of the stream or channel entrenchment.

Most areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat. A few areas are used for urban development.

This soil is well suited to hay and pasture. The main limitation is gentle slopes. The application of water should be regulated to prevent a rise in the level of the water table. Grasses and legumes grow well if adequate nitrogen fertilizer is applied. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is suited to irrigated crops. It is limited mainly by a deep fluctuating water table and gentle slopes. Deep-rooted crops are suited to areas where the drainage is adequate or where a drainage system has been installed. Furrow, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. If furrow or corrugation methods are used, runs should be on the contour or across the slope. Applications of irrigation water should be adjusted to the available water capacity and to the water intake rate to prevent a rise in the level of the water table. Because of limited depth to the water table, cuts required for leveling should be less than about 18 inches deep. All tillage should be on the contour or across the slope. Drop structures, diversions, and grassed waterways are needed in some areas. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are the deep seasonal high water table, moderate content of highly expandable clay, and moderate permeability. Special design of footings is needed to overcome the limitations of moderate shrink-swell potential and frost heave. Septic tank absorption fields require special

design to overcome the limitations of a deep seasonal high water table and moderately permeable subsoil.

Areas of this soil are limited for roads because of severe frost heave. Local roads and streets require a special base in some areas to avoid frost heave damage. Erosion can be minimized and maintenance costs reduced by providing roads with surface drainage, a stable base, and an adequate wearing surface.

This soil is in capability subclass IIw, irrigated.

502—James Canyon loam, drained, 4 to 8 percent slopes. This very deep, poorly drained soil is on slightly convex alluvial fans. The drainage is altered. This soil formed in alluvium derived from mixed sources of rock. Elevation is 4,700 to 4,900 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 31 inches thick. The underlying material to a depth of 60 inches is stratified, grayish brown and light brownish gray gravelly loam and clay loam.

Included with this soil in mapping are about 5 percent areas of soils in which the surface layer is very gravelly and 5 percent soils in small depressional areas in which the water table is at a depth of 2 to 3 feet.

Permeability of this James Canyon soil is moderate. Available water capacity is high. Runoff is medium, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 4 to 6 feet from December through May. The deep water table is the result of changes in the original course of the stream or channel entrenchment.

Most areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat. A few areas are used for urban development.

This soil is well suited to hay and pasture. The main limitation is moderate slopes. The application of irrigation water should be regulated to prevent a rise in the level of the water table. Grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is suited to irrigated crops. It is limited mainly by the moderate slopes and a deep fluctuating water table. Deep-rooted crops are suited to areas where the drainage is adequate or where a drainage system has been installed. Furrow, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. If furrow or corrugation irrigation is used, runs should be on the contour or across the slope. Application of irrigation water should be adjusted to the available water capacity and to the water intake rate to prevent a rise in the level of the water table. Because of the limited depth to the water table, cuts required for leveling should be less than about 18 inches deep. All tillage should be on the contour or across the slope. Drop structures, diversions, and grassed waterways are needed in some areas. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are a deep seasonal high water table, moderate content of highly expandable clay, and moderate permeability. Special design of footings is needed to overcome the moderate shrink-swell potential. Septic tank absorption fields require special design to overcome the limitations of a deep seasonal high water table and moderately permeable subsoil.

Areas of this soil are limited for roads because of the severe frost heave. Local roads and streets require a special base in some areas to avoid frost heave damage. Erosion can be minimized and maintenance costs reduced by providing roads with surface drainage, a stable base, and an adequate wearing surface.

This soil is in capability subclass IIIw, irrigated.

503—Kimmerling Variant peat, 2 to 8 percent slopes. This very deep, very poorly drained soil is on alluvial fans near springs and seeps. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is about 4,800 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is very dark gray peat about 8 inches thick. The underlying material to a depth of 32 inches is grayish brown loam. Below this to a depth of 60 inches is gray, stratified gravelly loam and gravelly clay loam.

Included with this soil in mapping is about 5 percent Kimmerling soils on slightly higher convex parts of alluvial fans.

Permeability of this Kimmerling Variant soil is moderate. Available water capacity is high. Runoff is slow, and the hazards of water erosion and soil blowing are slight. A water table is within a depth of 12 inches from December through May. This soil is subject to rare flooding.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat.

This soil is poorly suited to hay and pasture. The main limitations are slope and the water table near the surface during spring and early in summer. The use of equipment is limited by the water table. Tillage should be done during fall when the water table is low. All tillage and water spreading should be on the contour or across slopes. Wetness limits the choice of plants and the period of grazing and increases the risk of winterkill. Plants that tolerate wetness should be seeded. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling of livestock.

Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff.

Areas of this soil are limited for roads because of the seasonal high water table and severe frost heaving. Drainage or special design is needed to overcome the limitation imposed by the high water table. Local roads and streets require a special base to avoid frost heave damage.

This soil is in capability subclass Vw, irrigated.

511—James Canyon Variant loam, 2 to 4 percent slopes. This very deep, poorly drained soil is on slightly convex and concave alluvial fans and interfan areas. It formed in alluvium derived dominantly from granite, gneiss, and slate. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is very dark gray loam and sandy clay loam about 15 inches thick. The upper 21 inches of the underlying material is stratified, white, grayish brown, and pale brown sandy clay loam and sandy loam. The lower part of the underlying material to a depth of 60 inches is stratified, brown and pale brown loamy sand and loamy coarse sand.

Included with this soil in mapping is about 10 percent soil that has altered drainage and a water table at a depth of 3 to 5 feet because of the pumping and diversion of water. In Jack's Valley this soil has been drained by entrenchment of dendritic gullies.

Permeability of this James Canyon Variant soil is moderate. Available water capacity is moderate. Runoff is slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3.0 feet from December through June.

Areas of this soil are mainly used for hay, pasture, shallow-rooted irrigated crops, and wildlife habitat. A few areas are used for urban development.

This soil is suited to hay, pasture, and shallow-rooted irrigated crops. The main limitation is a moderately deep seasonal high water table. Grasses and legumes grow well if adequate fertilizer is used. The use of equipment is limited by wetness from the moderately deep water table. Irrigation water can be applied by the furrow and corrugation methods. Runs should be on the contour or across the slope. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil. Leveling helps to insure the uniform application of water. Because of the limited depth to the water table, cuts required for leveling should be less than about 9 inches. Seedbed preparation should be on the contour or across the slope where practical and in the fall when the water table is the lowest. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excess runoff. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are the moderately deep seasonal high water table, inadequate filtration of septic tank effluent, unstable sidewalls in cutbanks, and the moderate content of highly expandable clay. Special design is needed for septic tank absorption fields because of the seasonal high water table and to avoid polluting the ground water or nearby water supplies. Cutbanks are not stable and are subject to slumping. Support and stability for buildings are needed to overcome the limitations of the moderate shrink-swell potential. Drainage is needed if buildings with basements or deep foundations are constructed.

Areas of this soil are limited for roads because of severe frost heaving. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass IIIw, irrigated.

512—James Canyon Variant loam, slightly saline, 4 to 8 percent slopes. This very deep, poorly drained soil is on slightly undulating alluvial fans and interfan areas. The drainage is altered. This soil formed in alluvium derived dominantly from granite, gneiss, and slate. Slope is 4 to 8 percent. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is very dark gray loam about 15 inches thick. The upper 21 inches of the underlying material is stratified, pale brown and brown sandy loam and sandy clay loam, and the lower part to a depth of 60 inches is stratified, brown and pale brown loamy sand and loamy coarse sand.

Included with this soil in mapping is about 3 percent wet mineralized soils around hot springs and small areas of severely eroded soils that have an exposed sandy substratum. Also included is about 3 percent James Canyon soils that are in low spots, are strongly saline-alkali, and have a water table at a depth of 1.5 to 3.0 feet.

Permeability of this James Canyon Variant soil is moderate. Available water capacity is moderate. Runoff is slow, and the hazard of water erosion is slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through June. This water table has been lowered to its present depth by stream channel entrenchments, pumping, and water diversion. The surface layer is slightly affected by salt and alkali, but below this layer it is less affected.

Areas of this soil are mainly used for irrigated hay and pasture and wildlife habitat. A few areas are used for urban development.

This soil is suited to hay and pasture. The main limitations are a seasonal high water table and slight salt

and alkali accumulations in the surface layer. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Grasses and legumes grow well if adequate fertilizer is used. Irrigation water can be applied by the furrow and corrugation methods. Seedbed preparation and irrigation runs should be on the contour or across the slope where practical. Leveling helps to insure the uniform application of water. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Drainage and irrigation water management reduce the concentration of salts. Salt-tolerant species are more suitable for planting than most other species. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are the seasonal high water table, inadequate filtration of septic tank effluent, unstable sidewalls in cutbanks, and moderate shrink-swell. Special design is needed for septic tank absorption fields because of the seasonal high water table and to avoid polluting the ground water or nearby water supplies. Cutbanks are not stable and are subject to slumping. Support and stability for buildings are needed to overcome the moderate shrink-swell potential. Drainage is needed for buildings with basements or deep foundations.

Areas of this soil are limited for roads because of severe frost heaving. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

521—Job loam. This very deep, somewhat poorly drained soil is on smooth, nearly level flood plains. It formed in alluvium derived dominantly from granitic rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray loam about 9 inches thick. The upper 16 inches of the underlying material is light brownish gray, stratified very fine sandy loam and fine sandy loam, and the lower part to a depth of 60 inches is stratified, grayish brown and light brownish gray clay loam and loam. In some areas along the Carson River, the surface layer is slightly saline-alkali.

Included with this soil in mapping is about 5 percent Riverwash adjacent to the river.

Permeability of this Job soil is moderately slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. This soil is slightly affected by salt and alkali below the surface layer. It is subject to occasional, brief flooding from December through March.

Areas of this soil are used for irrigated hay, pasture, and crops and for wildlife habitat and urban development.

This soil is well suited to hay and pasture. It has few limitations. Grasses and legumes grow well if adequate nitrogen fertilizer is applied. Leveling helps to insure the uniform application of water. Leveling cuts should be limited to a depth of less than 25 inches because of the deep seasonal high water table. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is suited to irrigated crops. It is limited mainly by the deep seasonal high water table and occasional flooding. Proper application of irrigation water is needed to prevent a rise in the present water table and an increase in salinity and alkali. Drainage needed for deep-rooted crops is difficult because of lack of grade to an outlet. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are occasional flooding and the deep seasonal high water table. Drainage is needed for buildings with basements. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability. Buildings can be designed to offset the effects of moderate shrinking and swelling.

Areas of this soil are limited for roads because of occasional flooding and severe frost heaving. Structures to protect this soil from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heaving damage. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIw, irrigated.

523—Job loam, wet. This very deep, somewhat poorly drained soil is on nearly level, smooth flood plains. Drainage has been altered. This soil formed in alluvium derived dominantly from granitic rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average annual frost-free period is about 110 days.

Typically, the surface layer is light brownish gray loam about 9 inches thick. The upper 16 inches of the underlying material is light brownish gray, stratified very fine sandy loam and fine sandy loam, and the lower part to a depth of 60 inches is stratified, grayish brown and light brownish gray clay loam and loam. In some areas the surface layer is sandy loam. In some areas a gravelly substratum is below a depth of 48 inches.

Included with this soil in mapping is about 10 percent areas of soils that have a water table at a depth of 3 to 5 feet and are rarely flooded.

Permeability of this Job soil is moderately slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through June. This soil is slightly affected by salt and alkali below the surface layer. It is subject to occasional brief flooding from December through March.

Areas of this soil are used for irrigated hay, pasture, and shallow-rooted crops and for wildlife habitat.

This soil is suited to hay and pasture. The main limitations are the moderately deep seasonal high water table and occasional flooding. Grasses and legumes grow well if adequate nitrogen fertilizer is applied. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. The use of equipment is limited by wetness from the seasonal high water table. Leveling helps to insure the uniform application of water. Leveling cuts should be limited to a depth of less than 12 inches because of the water table. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The application of irrigation water should be regulated to prevent a rise in the level of the water table.

This soil is suited to shallow-rooted crops. It is limited mainly by the moderately deep seasonal high water table and occasional flooding. Leveling is needed for the efficient application and removal of irrigation water. Intensive management is required to maintain soil productivity. Proper application of irrigation water is needed to prevent a rise in the present water table and an increase in salinity and alkali. Deep drainage is difficult because of lack of grade to an outlet. Leveling cuts should be limited to a depth of less than 12 inches because of the water table. Furrow, border, and corrugation irrigation methods are suited to this soil. The method used generally is governed by the crop. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth and to reduce crusting of the surface layer.

Areas of this soil are limited for roads because of occasional flooding and severe frost heaving. Structures to protect this soil from flooding are difficult to establish and maintain. Roads require a special base in some areas to avoid frost heave damage. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IIIw, irrigated.

524—Job loam, clay substratum. This very deep, somewhat poorly drained soil is on slightly concave flood plains. Drainage is altered. This soil formed in alluvium derived dominantly from granitic rock. Slope is 0 to 2 percent. Elevation is about to 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray loam about 9 inches thick. The upper 16 inches of the underlying material is light brownish gray, stratified very fine sandy loam and fine sandy loam. The next 17 inches is light brownish gray, stratified loam and clay loam, and the lower part to a depth of 60 inches is stratified, grayish brown and light brownish gray clay.

Included with this soil in mapping is about 10 percent areas of soils that have a water table at a depth of 3 to 5 feet.

Permeability of this Job soil is moderate above a depth of 40 inches and is slow below a depth of 40 inches. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through May. Depth to the clay substratum ranges from 40 to 50 inches. This soil is subject to occasional, brief flooding from December through March. It is slightly saline and alkali throughout.

Areas of this soil are used for irrigated hay, pasture, and shallow-rooted crops and for wildlife habitat.

This soil is suited to hay and pasture. The main limitations are the moderately deep seasonal high water table, slow permeability, and occasional flooding. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. The use of equipment is limited by wetness from the seasonal high water table. Salt-tolerant species are more suitable for planting than most other species. Proper application of irrigation water is needed to prevent a rise in the present water table and an increase in salinity and alkali. Deep drainage is difficult because of the lack of grade to an outlet. Irrigation water can be applied by the border, corrugation, and furrow methods. Leveling helps to insure the uniform application of water. Leveling cuts should be limited to a depth of less than 12 inches because of the seasonal high water table. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Grazing when the soil is wet results in compaction. Grazing should be delayed until the soil is firm and the more desirable

forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for shallow-rooted crops are the slightly saline and alkali conditions, moderately deep water table, and occasional flooding. Proper application of irrigation water is needed to prevent a rise in the present water table and an increase in salinity and alkali. Deep drainage is difficult because of lack of grade to an outlet. Leveling is needed for the efficient application and removal of irrigation water. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Because of the slow permeability, the application of water should be regulated so that water does not stand on the surface and damage the crop. Salinity influences the choice of irrigated crops. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

Areas of this soil are limited for roads because of the occasional flooding and severe frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This soil is in capability subclass IVw, irrigated.

531—Jubilee loam. This very deep, poorly drained soil is on flood plains in slightly concave low depressions and sloughs. It formed in alluvium derived dominantly from granitic rock, but also from basalt, rhyolite, andesite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray loam about 5 inches thick. The next 32 inches is stratified, dark gray, grayish brown, and pale olive fine sandy loam and sandy loam. Below this to a depth of 60 inches is stratified, olive and light olive gray loamy sand and coarse sand. A small area near Clear Creek, adjacent to the Carson City area, is gently sloping.

Included with this soil in mapping adjoining the Carson City area is a small area of Urban land.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by the seasonal high water table at a depth of 1 to 2 feet from December through May. Wetness is the result of the low position of the soil in the bottom of concave sloughs. This soil is subject to rare flooding.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few small areas are used for urban development.

This soil is suited to hay and pasture. The main limitation is the shallow seasonal high water table. Climatically adapted grasses and legumes grow well if adequate fertilizer is used. The use of equipment is limited by wetness from the shallow water table. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. Surface drains can hold the water table at its present level. Irrigation water can be applied by the corrugation and furrow methods. Leveling helps to insure the uniform application of water. Cuts should be limited to a depth of less than about 6 inches because of the seasonal high water table. Application of irrigation water should be regulated to prevent a rise in the present water table. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are the shallow water table, unstable sidewalls in cutbanks, and rare flooding. Buildings should be located above the expected flood level. Drainage needs to be provided for buildings with basements and crawl spaces. Drainage is needed for septic tanks if they are to function properly.

Areas of this soil are limited for roads because of the severe frost heave and shallow depth to the water table. Special design is needed to overcome the limitations of severe frost heave and very shallow water table. Roads should be provided with surface drainage.

This soil is in capability subclass IIIw, irrigated.

532—Jubilee clay, slightly saline-alkali. This very deep, poorly drained soil is on flood plains in slightly concave low depressions and sloughs. It formed in alluvium derived dominantly from granitic rock, but also from rhyolite, andesite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray clay about 10 inches thick. The upper 25 inches of the underlying material is stratified, grayish brown and pale olive fine sandy loam and sandy loam. Below this to a depth of 60 inches is stratified, olive and light olive loamy fine sand and coarse sand.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 1 to 2 feet from December

to June. This soil is subject to occasional, brief flooding from December through March. The soil is slightly affected by salts and alkali in the surface layer but is not affected in the underlying material.

Areas of this soil are used for hay and pasture and wildlife habitat.

This soil is suited to hay and pasture. The main limitation is the shallow seasonal high water table. The use of equipment is limited by wetness caused by the shallow water table during the period of irrigation. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Because of limited depth to the water table, cuts required for leveling should be less than 6 inches deep. Deep drainage is difficult because of the lack of grade to an outlet. Surface drains can hold the water table at its present level and inhibit the growth of less palatable plants. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of shallow depth to the water table, occasional flooding, and severe frost heaving. Structures to protect this soil from flooding are difficult to establish and maintain. Roads require a special base in some areas to avoid frost heave damage. Roads should be provided with surface drainage.

This soil is in capability subclass Vw, irrigated.

533—Jubilee Variant peat. This very deep, very poorly drained soil is on flood plains in slightly concave low depressions and sloughs. It formed in alluvium derived from granitic and volcanic sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is very dark gray peat about 6 inches thick. The next 41 inches is stratified, dark grayish brown and light olive gray fine sandy loam and sandy loam. Below this to a depth of 60 inches is stratified, light olive gray sandy loam and coarse sand.

Included with this soil in mapping is about 5 percent Jubilee soils on convex parts of the flood plains.

Permeability of this Jubilee Variant soil is moderately rapid. Available water capacity is moderate. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table within a depth of 12 inches from December through June. This soil is subject to occasional, brief flooding from December through March.

Areas of this soil are used for hay and pasture and wildlife habitat.

This soil is poorly suited to hay and pasture. The main limitation is the very shallow water table. Grasses and legumes grow well if adequate fertilizer is used. The use of equipment is limited by water at or near the surface. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. Drainage is difficult because of the lack of suitable grade to an outlet. Surface drains can hold the water table at its present level and inhibit the growth of less palatable plants. Grazing when the soil is wet results in compaction of the surface layer and poor tilth. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of shallow depth to the water table, severe frost heaving, and occasional flooding. Drainage is needed if roads are constructed. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flooding are difficult to establish and maintain.

This soil is in capability subclass VIw, irrigated.

534—Jubilee-Dressler-Kimmerling complex. This complex is on flood plains and alluvial terraces. Slope is 0 to 2 percent. Elevation is 4,800 to 5,100 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This complex is 35 percent Jubilee loam, 30 percent Dressler sandy loam, and 20 percent Kimmerling loam. The Jubilee soil is on higher parts of the flood plain. The Dressler soil is on alluvial terraces above the flood plain, and the Kimmerling soil is on lower parts of the flood plain. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 2 percent soils in drainageways that are flooded during February through July, 2 percent riverwash adjacent to the river bed, 5 percent Brockliss Variant soils, drained, on drier parts of alluvial terraces with the Dressler soils (range site: 26-30), and 6 percent fine-loamy, mixed, mesic Cumulic Haplaquolls, on frequently flooded concave basins (range site: 26-3). The included soils make up about 15 percent of mapped areas.

The Jubilee soil is very deep and poorly drained. It formed in alluvium derived dominantly from granitic rock but also from basalt, rhyolite, andesite, gneiss, and slate. Typically, the surface is covered with a mat of roots about 4 inches thick. The surface layer is dark gray loam about 10 inches thick. The upper 28 inches of the underlying material is pale olive, stratified coarse sandy loam and fine sandy loam, and the lower part to a depth of 60 inches is light olive gray, stratified coarse sand and sandy loam.

Permeability of the Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. A seasonal high water table fluctuates between depths of 1 and 2 feet in December through June. This soil is subject to occasional, brief flooding from December through March.

The Dressler soil is very deep and somwhat poorly drained. It formed in alluvium derived dominantly from granitic and various igneous rocks. The surface layer is dark grayish brown sandy loam about 18 inches thick. The underlying material to a depth of 60 inches is stratified, pale brown and yellowish brown loamy sand and sandy loam.

Permeability of the Dressler soil is moderately rapid. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from December through May. This soil is subject to occasional, brief flooding in December through March.

The Kimmerling soil is very deep and poorly drained. It formed in alluvium derived dominantly from granitic rock, but also from basalt, rhyolite, gneiss, and slate. Typically, the surface layer is dark gray loam about 22 inches thick. The upper 20 inches of the underlying material is dark gray, stratified loam and clay loam. Below this to a depth of 60 inches is gray, stratified gravelly loamy sand and silty clay loam with dark gray, greenish gray, and red iron mottles.

Permeability of the Kimmerling soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 1 foot to 2 feet from December through May. This soil is subject to occasional, brief flooding from December through March.

Areas of this complex are used for livestock grazing, hay and pasture, and wildlife habitat.

The potential plant community on the Jubilee soil is mainly creeping wildrye, basin wildrye, and Nevada bluegrass. The present vegetation in most areas is mainly wild roses, creeping wildrye, Nevada bluegrass, basin wildrye, and willow. The production of vegetation suitable for livestock grazing is limited by the low precipitation and low water table in summer. The suitability of this soil for rangeland seeding is good. The main limitation for seeding is the low precipitation in summer.

The potential plant community on the Dressler soil is mainly creeping wildrye, basin wildrye, and Nevada bluegrass. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by the low precipitation and low water table in summer. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately deep seasonal high water table and low annual precipitation.

The potential plant community on the Kimmerling soil is mainly basin wildrye, creeping wildrye, and Nevada bluegrass. The present vegetation in most areas is willow, creeping wildrye, sedges, and rushes. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and the low water table in summer. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the shallow seasonal high water table in spring and the low average annual precipitation. Plants that tolerate wetness should be seeded. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

These soils are suited to hay and pasture. The main limitation is the shallow or moderately deep seasonal high water table during spring. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Fertilizer is needed to insure optimum growth of grasses and legumes. Use of nitrogen fertilizer promotes good growth of forage plants. Rotation grazing helps to maintain the quality of forage. Irrigation is needed when the water table is low. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts and alkali in the soil.

Areas of this complex are limited for roads because of occasional flooding and severe frost heaving and low strength in the Kimmerling soil. Structures to protect these soils from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads on the Kimmerling soil are difficult to maintain because of the moderate content of highly expandable clay, which has low strength when wet. Trafficability of roads can be improved by providing a stable base, an adequate wearing surface, and surface drainage.

This complex is in capability subclass Vw, irrigated. It is in range site 26-1.

541—Softscrabble-Glean-Genoa association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 8,000 to 8,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 75 days.

This association is 50 percent Softscrabble extremely cobbly loam, 30 to 50 percent slopes, 25 percent Glean extremely stony sandy loam, 15 to 50 percent slopes, and 10 percent Genoa extremely stony fine sandy loam, 15 to 50 percent slopes. The Glean soil is on north-facing side slopes, and the Genoa soil is on ridges.

Included with these soils in mapping are about 5 percent Sup soils on concave mountain slopes near ridges (range site: 26-9), 5 percent Chen soils that have a very gravelly clay subsoil (range site: 26-29), and 5 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Softscrabble soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with 30 to 40 percent cobbles. The surface layer is grayish brown and dark grayish brown extremely cobbly loam about 14 inches thick. The upper 13 inches of the subsoil is brown extremely gravelly clay loam, and the lower part to a depth of 60 inches is dark brown very gravelly loam.

Permeability of the Softscrabble soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Glean soil is very deep and deep and is well drained. It formed in colluvium derived dominantly from granitic and metavolcanic rocks. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is dark grayish brown and brown extremely stony sandy loam about 6 inches thick. The upper 33 inches of the underlying material is brown very gravelly loam, and the lower part to a depth of 60 inches is light brownish gray very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Genoa soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is grayish brown extremely stony fine sandy loam about 4 inches thick. The subsoil is brown very cobbly sandy clay loam about 14 inches thick. Granitic bedrock is at a depth of 18 inches.

Permeability of the Genoa soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Softscrabble soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and mountain brome. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the extremely cobbly surface.

The potential plant community on the Glean soil is mainly mountain big sagebrush, spike-fescue, western needlegrass, and Columbia needlegrass. The present vegetation in most areas is mainly mountain big sagebrush and western needlegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the extremely stony surface.

The potential plant community on the Genoa soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity, steep slopes, and extremely stony surface.

Steepness of slope in areas of this association limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Because of the cold soil temperatures and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Genoa soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of moderately steep and steep slopes and shallow depth to bedrock on the Genoa soil. Special design of roads is needed to overcome the limitation of slope. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Because of the underlying bedrock, deep cuts should be avoided, especially on the Genoa soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Softscrabble soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38. The Genoa soil is in capability subclass VIIe, nonirrigated, and range site 26-28.

552—Kimmerling loam, wet. This very deep, poorly drained soil is on smooth flood plains. The drainage is altered. This soil formed in alluvium derived dominantly

from granitic rock, but also from basalt, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with a mat of root sod about 4 inches thick. The surface layer is gray and dark gray loam about 26 inches thick. The upper 12 inches of the underlying material is light olive gray, stratified clay loam to loam that has olive and dark grayish brown iron mottles. Below this to a depth of 60 inches is variegated light gray, pale yellow, and light yellowish brown cobbly sandy loam that has dark reddish brown and dark yellowish brown iron mottles and black manganese stains. In some areas the surface layer is gravelly loam.

Included with this soil in mapping is an area of Kimmerling soil west of Minden that has a water table at a depth of about 24 inches and is slightly saline-alkali. The included soil makes up about 3 percent of the mapped areas.

Permeability of this Kimmerling soil is moderately slow. Available water capacity is high. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. Effective rooting depth is limited by a seasonal high water table at a depth of 0.5 to 1.5 feet from December through May. This soil is subject to occasional, brief flooding from December through March.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat.

This soil is suited to hay and pasture. The main limitation is insufficient irrigation water late in the growing season. Grasses and legumes grow well if adequate nitrogen fertilizer is applied. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and slow infiltration. In most years, supplemental irrigation is also needed. Leveling helps to insure the uniform application of water. Because of the limited depth to the water table, cuts required for leveling should be less than 6 inches deep. Deep artificial drainage of this soil is difficult because of the lack of grade to an outlet. Surface drains can be used to maintain the water table at its present level and to inhibit the growth of the less palatable water-tolerant plants.

Areas of this soil are limited for roads because of the shallow water table, occasional flooding, and severe frost heaving. To establish and maintain structures to protect this soil from flooding is difficult. Drainage or special design is needed to overcome the limitations of severe frost heaving and the high water table.

This soil is in capability unit Vw, irrigated.

553—Kimmerling clay loam. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived dominantly from granitic rock, but also from basalt, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray clay loam about 8 inches thick. Next is dark gray and gray, stratified clay loam and silty clay loam about 40 inches thick. The underlying material to a depth of 60 inches is light gray, stratified gravelly loamy sand to silty clay loam.

Included with this soil in mapping about 1 mile southwest of Minden is an area of soils that are slightly saline-alkali and have a surface layer of loam. The included soils make up about 2 percent of mapped areas.

Permeability of this Kimmerling soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1 to 2 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional brief flooding in December through March.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat and urban development.

This soil is suited to hay and pasture. The main limitations are the shallow seasonal high water table and occasional flooding. Shallow-rooted, water-tolerant plants are suited to this soil. Irrigation water can be applied by the border, corrugation, and furrow methods. The rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Leveling helps to insure the uniform application of water. Because of limited depth to water, cuts required for leveling should be less than 9 inches deep. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are shallow depth to the seasonal high water table, occasional flooding, and instability of sidewalls in cutbanks. Drainage should be provided for buildings with basements or crawl spaces. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability.

Areas of this soil are limited for roads because of low strength, occasional flooding, and severe frost heaving. Roads are difficult to maintain because of severe frost heave and low strength. To establish and maintain structures to protect this soil from flooding is difficult. Roads require a special base in some areas to reduce maintenance costs resulting from low strength and

severe frost heave. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

555—Kimmerling clay loam, clay substratum. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived dominantly from granitic rock, but also from basalt, rhyolite, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is 100 days.

Typically, the surface layer is dark gray clay loam about 8 inches thick. Next is stratified, gray loam and silty clay loam about 34 inches thick. The underlying material to a depth of 60 inches is clay.

Included with this soil in mapping is about 7 percent Kimmerling soils in depressions. These soils have a seasonal high water table within a depth of 12 inches during the growing season.

Permeability of this Kimmerling soil is moderately slow to a depth of 42 inches and slow below this depth. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1 to 2 feet from March through June. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional brief flooding in December through March.

Most areas of this soil are used for irrigated hay and pasture and wildlife habitat. A few areas are used for urban development.

This soil is suited to hay and pasture. The main limitations are shallow depth to the seasonal high water table, slow permeability, and occasional flooding. Because of the slow permeability and high water table, the application of water should be regulated so that water does not stand on the surface and damage the crops. Shallow-rooted plants that tolerate wet soil conditions are suited. Irrigation water can be applied by the border, corrugation, and furrow methods. Leveling helps to insure the uniform application of water. Because of limited depth to water, cuts required for leveling should be less than 9 inches deep. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are the shallow water table, occasional flooding, and a slowly permeable clay substratum. Drainage should be provided for buildings with basements or crawl spaces. Buildings need to be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and slow permeability.

Areas of this soil are limited for roads because of the low strength, occasional flooding, and severe frost heaving. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. To establish and maintain structures to protect this soil from flooding is difficult. Roads require a special base in some areas to avoid frost heave damage and the effects of highly expandable clay. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

561—Koontz-Sutro complex, 15 to 30 percent slopes. This complex is on rounded foothills. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This complex is 60 percent Koontz very gravelly loam, 15 to 30 percent slopes, and 25 percent Sutro very stony loam, 15 to 30 percent slopes. The Koontz soil is on south- and west-facing side slopes, and the Sutro soil is on north-facing side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent Springmeyer soils on alluvial fans at the base of the hills (range site: 26-10) and 10 percent very deep, gravelly Cassiro soils on steep concave slopes (range site: 26-10). The included soils make up about 15 percent of mapped areas.

The Koontz soil is shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface layer is brown very gravelly loam about 5 inches thick. The subsoil is dark brown very gravelly loam about 7 inches thick. Weathered metavolcanic bedrock is at a depth of 12 inches.

Permeability of the Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Sutro soil is moderately deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with about 3 to 15 percent stones. The surface layer is brown very stony loam about 10 inches thick. The subsoil is brown gravelly loam about 29 inches thick. The weathered metavolcanic bedrock is at a depth of 39 inches.

Permeability of the Sutro soil is moderate. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of these soils are used for livestock grazing and wildlife habitat.

The potential plant community on the Koontz soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Sutro soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the very stony surface.

Because of low and very low available water capacities in these soils and the competition from the sagebrush and trees for moisture, desirable grasses are very slow to recover even if grazing management is good. Seeding large areas of the Sutro soil is difficult. This is because of the pattern in which this soil occurs with the Koontz soil. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Koontz soil to produce vegetation suitable for grazing. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland community in some areas is difficult.

Areas of this complex are limited for roads because of moderately steep slopes. The hazard of frost heave and the shallow depth to bedrock on the Koontz soil are moderate limitations. Because of the underlying bedrock, deep cuts should be avoided, especially on the Koontz soils. Roads need to be located on the less sloping areas, if possible, to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage. Local roads and streets require a special base in some areas to avoid frost heave damage.

This complex is in capability subclass VIIe, nonirrigated. The Koontz soil is in range site 26-15, and the Sutro soil is in range site 26-10.

562—Koontz-Sutro complex, 30 to 50 percent slopes. This complex is on rounded hills. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This complex is 60 percent Koontz extremely stony loam, 30 to 50 percent slopes, and 25 percent Sutro very stony loam, 30 to 50 percent slopes. The Koontz soil is on south- and west-facing side slopes, and the Sutro soil is on north- and east-facing side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent Springmeyer soils on alluvial fans at the base of hills (range site: 26-10) and 10 percent very deep, gravelly Cassiro soils on steep concave slopes (range site: 26-10). The included soils make up about 15 percent of mapped areas.

The Koontz soil is shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is brown extremely stony loam about 3 inches thick. The subsoil is brown very gravelly loam about 11 inches thick. Weathered metavolcanic bedrock is at a depth of 14 inches.

Permeability of the Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Sutro soil is moderately deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 10 inches thick. The subsoil and substratum are brown gravelly loam and gravelly fine sandy loam about 29 inches thick. Weathered metavolcanic bedrock is at a depth of 39 inches.

Permeability of the Sutro soil is moderate. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this complex are used for livestock grazing and wildlife habitat.

The potential plant community on the Koontz soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Sutro soil is mainly Wyoming big sagebrush, antelope bitterbrush,

Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of the soil for rangeland seeding is very poor. The main limitation for seeding is the steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Koontz soil to produce vegetation suitable for grazing. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this complex are limited for roads because of steep slopes. Frost heaving and the shallow depth to bedrock are moderate limitations on the Koontz soil. Because of underlying bedrock, deep cuts should be avoided, especially on the Koontz soil. Roads need to be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Local roads and streets require a special base in some areas to avoid moderate frost heave damage.

This complex is in capability subclass VIIe, nonirrigated. The Koontz soil is in range site 26-15, and the Sutro soil is in range site 26-10.

571—Kram-Puett Variant association. This association is on rounded hills and terraces. Slope is 15 to 50 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 47 degrees F., and the average frost-free period is about 100 days.

This association is 55 percent Kram very gravelly very sandy loam, 15 to 50 percent slopes, and 30 percent Puett Variant very gravelly loam, 15 to 30 percent slopes. The Kram soil is on slopes and ridges of hills, and the Puett Variant soil is on terraces at the base of the hills.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and side slopes, 4 percent moderately deep Cagle soils (woodland site: Pinyon-juniper woodland), 2 percent Stodick soils on foothill ridges (range site: 26-15), 2 percent deep Nosrac soils on north-facing foothills (range site: 26-5), 1 percent deep, clayey Phing soils intermingled with the Puett Variant soil on terraces (range site: 26-25), and 1 percent Brockliss Variant soils, drained, in drainageways (range site: 26-30). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Kram soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from limestone. Typically, the surface layer is pale brown very gravelly very fine sandy loam about 3 inches thick. The underlying material is pale brown very gravelly very fine sandy loam about 7 inches thick. Limestone bedrock is at a depth of 10 inches. In some areas the surface layer is very cobbly.

Permeability of the Kram soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 14 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Puett Variant soil is moderately deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is brown very gravelly loam about 8 inches thick. The underlying material to a depth of 28 inches is pale brown very gravelly fine sandy loam. Soft weathered Tertiary mudstone is at a depth of 28 inches.

Permeability of the Puett Variant soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 24 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for woodland and wildlife habitat.

The Kram soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 3 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the shallow depth to bedrock, steep slopes, and very low available water capacity.

The Puett Variant soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity and moderate depth to Tertiary mudstone.

In areas of this association, the young trees can be cut for use as Christmas trees. Minimizing the risk of erosion is essential in the harvesting of trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous.

Areas of this association are limited for roads because of moderately steep and steep slopes and because of the shallow depth to hard bedrock on the Kram soil. The

depth to weathered bedrock on the Puett Variant soil and frost heave are moderate limitations. Because of the underlying bedrock, deep cuts should be avoided, especially on the Kram soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Local roads and streets require a special base in some areas to avoid moderate frost heave damage.

The Kram soil is in capability subclass VIIe, nonirrigated. The Puett Variant soil is in capability subclass VIIs, nonirrigated.

581—Loomer association. This association is on foothills. Slope is 15 to 50 percent. Elevation is 5,800 to 6,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 51 degrees F., and the average frost-free period is about 110 days.

This association is 50 percent Loomer extremely cobbly loam, 15 to 30 percent slopes, and 35 percent Loomer extremely cobbly loam, 30 to 50 percent slopes. The Loomer soil, 15 to 30 percent slopes, is on south- and west-facing slopes. The Loomer soil, 30 to 50 percent slopes, is on north- and east-facing slopes.

Included with these soils in mapping are about 8 percent Theon soils on toe slopes (range site: 27-19), 2 percent Phing soils on terraces (range site: 26-25), 4 percent Greenbrae soils on alluvial fans (range site: 26-16), and 1 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Loomer soil, 15 to 30 percent slopes, is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 30 to 40 percent cobbles. The surface layer is pale brown extremely cobbly loam about 3 inches thick. The subsoil is reddish brown extremely gravelly clay about 14 inches thick. Andesite bedrock is at a depth of 17 inches.

Permeability of the Loomer soil, 15 to 30 percent slopes, is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Loomer soil, 30 to 50 percent slopes, is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 30 to 40 percent cobbles. The surface layer is grayish brown extremely cobbly loam about 4 inches thick. The subsoil is reddish brown and about 15 inches thick. It averages extremely gravelly clay. Andesite bedrock is at a depth of 19 inches.

Permeability of the Loomer soil, 30 to 50 percent slopes, is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of water erosion is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Loomer soil, 15 to 30 percent slopes, is mainly low sagebrush, Nevada ephedra, desert needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low average annual precipitation and very low available water capacity.

The potential plant community on the Loomer soil, 30 to 50 percent slopes, is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes, very low available water capacity, and low annual precipitation.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Because of the low average annual precipitation and competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Use of machinery is not practical, because the surface is extremely cobbly and the slopes are moderately steep or steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity of these soils and in the potential to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of the moderately steep and steep slopes, extremely cobbly surface, and shallow depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Special design is needed to overcome the limitation of depth to bedrock. Cobbles on the surface can make the construction of roads difficult.

The Loomer soil, 15 to 30 percent slopes, is in capability subclass VIIe, nonirrigated, and range site 26-

41. The Loomer soil, 30 to 50 percent slopes, is in capability subclass VIIe, nonirrigated, and range site 26-25.

582—Loomer-Olac association. This association is on slopes of mountains. Slope is 30 to 50 percent. Elevation is 5,500 to 6,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 55 percent Loomer extremely cobbly loam, 15 to 30 percent slopes, and 30 percent Olac very stony loam, 30 to 50 percent slopes. The Loomer soil is on concave side slopes, and the Olac soil is on ridges and convex side slopes.

Included with these soils in mapping are about 10 percent Greenbrae soils on foot slopes (range site: 26-16), 2 percent Haybourne soils on alluvial fans (range site: 26-16), and 3 percent Rock outcrop on ridges and side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Loomer soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is light brownish gray extremely cobbly loam about 2 inches thick. The subsoil is dark brown extremely gravelly clay about 15 inches thick. Andesite bedrock is at a depth of 17 inches.

Permeability of the Loomer soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Olac soil is shallow and very shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brownish gray and brown very stony loam about 3 inches thick. The subsoil is brown extremely gravelly loam about 7 inches thick. Andesite bedrock is at a depth of 10 inches.

Permeability of the Olac soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 14 inches. Runoff is very rapid, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Loomer soil is mainly low sagebrush, Nevada ephedra, desert needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Olac soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

Because of the very low available water capacity and competition from the sagebrush for moisture, desirable grasses on the soils are very slow to recover even if management is good. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Loomer soil. Use of machinery is not practical, because of steep slopes and because the surface is extremely cobbly or very stony. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of the moderately steep and steep slopes, shallow depth to bedrock, and the extremely cobbly surface of the Loomer soil. Because of the underlying bedrock, deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Stones and cobbles on the surface make the construction of roads difficult.

The Loomer soil is in capability subclass VIIe, nonirrigated, and range site 26-41. The Olac soil is in capability subclass VIIs, nonirrigated, and range site 26-25.

583—Loomer-Zephan-Olac association. This association is on rolling hills. Slope is 15 to 50 percent. Elevation is 5,200 to 6,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 110 days.

This association is 35 percent Loomer extremely cobbly loam, 15 to 30 percent slopes, 35 percent Zephan extremely cobbly loam, 15 to 50 percent slopes, eroded, and 20 percent Olac extremely stony loam, 15 to 50 percent slopes. The Loomer soil is on north-facing side slopes, the Zephan soil is on south-facing side slopes, and the Olac soil is on ridges.

Included with these soils in mapping are about 2 percent Veta soils in drainageways (range site: 26-34), 3

percent Theon soils on lower side slopes (range site: 27-19), and 5 percent Phing soils on toe slopes (range site: 26-25). The included soils make up about 10 percent of mapped areas.

The Loomer soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is brown extremely cobbly loam about 4 inches thick. The subsoil is dark brown and dark yellowish brown extremely gravelly clay about 11 inches thick. Andesite bedrock is at a depth of 15 inches.

Permeability of the Loomer soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Zephan soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is light brownish gray extremely cobbly loam about 2 inches thick. The subsoil is dark brown and yellowish brown very cobbly clay about 35 inches thick. Soft andesite bedrock is at a depth of 37 inches.

Permeability of the Zephan soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. Sheet and rill erosion have moderately eroded this soil.

The Olac soil is shallow and very shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 4 inches thick. The subsoil is yellowish brown extremely gravelly clay loam about 10 inches thick. Hard andesite bedrock is at a depth of 14 inches.

Permeability of the Olac soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 14 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Loomer soil is mainly low sagebrush, Nevada ephedra, desert needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Zephan soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the steep slopes.

The potential plant community on the Olac soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the steep slopes, extremely stony surface, and very low available water capacity.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to prevent overgrazing in the less sloping areas. Because of the moderately low average annual precipitation and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. The use of machinery is not practical because the surface is stony and cobbly and slopes are steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing.

Areas of this association are limited for roads because of the moderately steep and steep slopes, shallow depth to bedrock in the Loomer and Olac soils, surface cobbles and stones, and the presence of highly expandable clay in the Zephan soil. Because of the underlying bedrock, deep cuts should be avoided, especially in the Loomer and Olac soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Roads on the Zephan soil are difficult to maintain because of the clay, which has low strength when wet. Stones and cobbles on the surface make the construction of roads difficult.

The Loomer soil is in capability subclass VIIe, nonirrigated, and range site 26-41. The Zephan and Olac soils are in capability subclass VIIs, nonirrigated, and range site 26-25.

591—Minneha-Drit-Glean association. This association is on slopes of mountains. Slope is 50 to 75 percent. Elevation is 6,500 to 7,500 feet. The average

annual precipitation is about 14 inches, the average annual temperature is 47 degrees F., and the average frost-free period is about 90 days.

This association is 45 percent Minneha very gravelly sandy loam, 50 to 75 percent slopes, 25 percent Drit very stony sandy loam, 50 to 75 percent slopes, and 15 percent Glean very gravelly sandy loam, 50 to 75 percent slopes. The Minneha soil is on south- and west-facing side slopes. The Drit soil is on north- and east-facing side slopes, and the Glean soil is on concave north-facing slopes at the higher elevations.

Included with these soils in mapping are about 5 percent Genoa soils on ridges (range site: 26-28), 3 percent Roloc soils on south-facing toe slopes (range site: 26-11), 1 percent Brockliss Variant soils in drainage bottoms adjacent to springs (range site: 26-3), 1 percent Brockliss Variant soils, drained, in drainage bottoms (range site: 26-30), 1 percent Sup soils on concave slopes near ridges (range site: 26-9), and 4 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Minneha soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is dark grayish brown and brown very gravelly sandy loam about 7 inches thick. The underlying material is dark grayish brown and brown very gravelly sandy loam about 11 inches thick. Weathered granitic bedrock is at a depth of 18 inches.

Permeability of the Minneha soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 13 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown and brown very stony sandy loam about 15 inches thick. Below this to a depth of 60 inches is brown and yellowish brown very gravelly coarse sandy loam.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface layer is dark grayish brown very gravelly sandy loam about 8 inches thick. The upper 22 inches of the underlying material is brown very gravelly sandy loam. Below this to a depth of 60 inches is yellowish brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Minneha soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 5 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity, shallow depth to bedrock, and very steep slopes. Minimizing the risk of erosion is essential in harvesting trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The steepness of slope limits the kinds of equipment that can be used in woodland management.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very steep slope and low available water capacity of the surface layer. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The potential plant community on the Glean soil is mainly mountain big sagebrush, Columbia needlegrass, basin wildrye, and western needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, snowberry, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity, cold soil temperatures, and short growing season. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very steep slopes and very low available water capacity in the surface layer.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Use of machinery is not practical because of the very steep slopes. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the very steep slopes. Special design for roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and

maintenance cost reduced by stabilizing areas that have been disturbed.

The Minneha soil is in capability subclass VIIe, nonirrigated. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38.

592—Minneha-Drit-Rock outcrop association. This association is on slopes of mountains. Slope is 50 to 75 percent. Elevation is 6,000 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 90 days.

This association is 40 percent Minneha extremely stony sandy loam, 50 to 75 percent slopes, 30 percent Drit extremely stony sandy loam, 50 to 75 percent slopes, and 15 percent Rock outcrop. The Minneha soil is on south-facing convex slopes, ridges, and shoulders. The Drit soil is on north- and east-facing slopes. Rock outcrop is interspersed with Minneha and Drit soils on ridges, shoulders, and side slopes.

Included with these soils in mapping are about 5 percent Roloc soils, eroded, intermingled with the Minneha soil on ridges (range site: 26-11), 3 percent Kram soils adjacent to occasional, thin outcrops of limestone (woodland site: Pinyon-juniper woodland), 3 percent Mottsville soils on south-facing toe slopes (range site: 26-26), 1 percent Holbrook soils on alluvial fans (range site: 26-10), 1 percent Sup soils on steep concave north-facing slopes (range site: 26-9), 1 percent Brockliss Variant soils on drainageways near springs (range site: 26-3), and 1 percent Brockliss Variant soils, drained, in drainageways (range site: 26-10). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Minneha soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is dark grayish brown extremely stony sandy loam about 8 inches thick. The underlying material is light brownish gray very gravelly sandy loam about 7 inches thick. Weathered granite bedrock is at a depth of 15 inches. Some areas are slightly higher and colder than normal for the Minneha soil. Slopes are 30 to 50 percent in some areas.

Permeability of the Minneha soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 13 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is grayish brown extremely stony sandy loam about 15 inches thick. Below this to a depth of 60 inches is dark brown very gravelly coarse sandy loam. Some areas are at a slightly higher elevation and are colder than normal for the Drit soil.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Minneha soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 5 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the shallow depth to bedrock, very low available water capacity, and very steep slopes. Minimizing the risk of erosion is essential in harvesting trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The steepness of slope limits the kinds of equipment that can be used in woodland management.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very steep slopes and the very low available water capacity of the surface layer.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Mechanical treatment is not practical because the slopes are very steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in most areas is difficult.

Areas of this association are limited for roads because of the very steep slopes and common outcrops of rock. Special design is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

The Minneha soil is in capability subclass VIIe, nonirrigated. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5. Rock outcrop is in capability subclass VIIIs, nonirrigated.

601—Mottsville loamy coarse sand, 2 to 4 percent slopes. This very deep, excessively drained soil is on convex alluvial fans. It formed in alluvium derived from granitic rock. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loamy coarse sand about 24 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified loamy sand and gravelly coarse sand. In some areas the underlying material is stony in the lower part. In some small areas slope is 0 to 2 percent.

Included with this soil in mapping is about 3 percent loamy Holbrook soils in random areas (range site: 26-10). Adjacent to the Carson City area is about 1 percent Urban land. The included soils make up about 4 percent of mapped areas.

Permeability of this Mottsville soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. They are also used for urban development. This soil is suited to irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly mountain big sagebrush, antelope bitterbrush, Indian ricegrass, and needleandthread. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity in the surface layer. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the low available water capacity and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even though management is good. Livestock grazing should be managed to protect this soil from excessive soil blowing and drifting of sand.

The main limitations for urban development are unstable sidewalls of cutbanks and inadequate filtration of septic tank effluent. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control soil blowing. Cutbanks are not stable and are subject to slumping. Because the substratum is rapidly permeable, special design of septic tank filter fields is needed in some areas to avoid polluting ground water or nearby water supplies. Community sewer systems are needed in areas of moderate to high density housing to prevent contamination of water supplies as a result of seepage.

Areas of this soil have few limitations for roads. Access roads must be designed to provide adequate slope in cutbanks, and drains must be provided to control surface runoff and keep soil losses to a minimum. Roads on this soil require an adequate wearing surface to limit maintenance cost. During prolonged dry periods roads are difficult to maintain because of the presence of loose sand, which results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass IIIs, irrigated, and VIIs, nonirrigated. It is in range site 26-8.

602—Mottsville gravelly loamy coarse sand, 4 to 15 percent slopes. This very deep, excessively drained soil is on convex alluvial fans. It formed in alluvium derived dominantly from granitic rock. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark grayish brown and grayish brown gravelly loamy coarse sand about 18 inches thick. The underlying material to a depth of 60 inches is light brownish gray gravelly coarse sand. In some small areas slopes are less than 4 percent.

Included with this soil in mapping is about 5 percent of sandy, mixed, mesic Entic Xerumbrepts that are on inset alluvial fans and are subject to rare flooding (range site: 26-8).

Permeability of this Mottsville soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. They are also used for urban development. This soil is suited to irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly mountain big sagebrush, antelope bitterbrush, Indian ricegrass, and needleandthread. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity in the surface layer. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the low available water capacity and competition from the

sagebrush for moisture, desirable grasses are slow to recover even if management is good.

The main limitations for urban development are inadequate filtration of septic tank effluent, unstable sidewalls in cutbanks, and strong slopes in the upper part of areas. Preserving the existing plant cover during construction helps to control erosion. Cutbanks are not stable and are subject to slumping. Because the substratum is rapidly permeable, special design of septic tank filter fields is needed in some areas to avoid polluting ground water or nearby water supplies. Community sewer systems are needed in areas of moderate to high density housing to prevent contamination of water supplies as a result of seepage. The steepness of slope is a concern in installing septic tank absorption fields in some areas. Absorption lines should be installed on the contour.

Areas of this soil are moderately limited for roads because of strong slopes in the upper part of areas. Access roads must be designed to provide adequate slope in cutbanks, and drains must be provided to control surface runoff and keep soil losses to a minimum. Roads require an adequate wearing surface to limit maintenance cost.

This soil is in capability subclass IVs, irrigated, and VIIs, nonirrigated. It is in range site 26-8.

603—Mottsville very bouldery loamy coarse sand, 2 to 15 percent slopes. This very deep, excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rock. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown very bouldery loamy coarse sand about 24 inches thick. The underlying material to a depth of 60 inches is light brownish gray gravelly loamy coarse sand.

Included with this soil in mapping is about 5 percent areas of soils on inset fans that are subject to occasional flooding.

Permeability of this Mottsville soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. They are also used for urban development.

The potential plant community on this soil is mainly mountain big sagebrush, antelope bitterbrush, needleandthread, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the low available water capacity and competition from sagebrush for moisture, desirable grasses are very slow to recover even if management is good.

The main limitations for urban development are inadequate filtration of septic tank effluent, strong slopes in the upper part of areas, unstable sidewalls in cutbanks, and rare flooding. Buildings should be located above the expected flood level. Preserving the existing plant cover during construction helps to control erosion. Cutbanks are not stable and are subject to slumping. Because the substratum is rapidly permeable, special design of septic tank filter fields is needed in some areas to avoid polluting ground water or nearby water supplies. Community sewers are needed in areas of moderate to high density housing to prevent contamination of water supplies as a result of seepage. The steepness of slope is a concern in installing septic tank absorption fields in places. Absorption lines should be installed on the contour.

Areas of this soil are moderately limited for roads because of rare flooding and strong slopes. Access roads must be designed to provide adequate slope in cutbanks, and drains must be provided to control surface runoff and keep soil losses to a minimum. Structures to protect this soil from flash flooding are difficult to establish and maintain.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-8.

604—Mottsville-Drit-Roloc association. This association is on slopes of mountains. Slope is 15 to 75 percent. Elevation is 5,200 to 7,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 40 percent Mottsville loamy coarse sand, 15 to 50 percent slopes, 30 percent Drit very stony sandy loam, 50 to 75 percent slopes, and 20 percent Roloc very gravelly sandy loam, 15 to 50 percent slopes, eroded. The Mottsville soil is on toe slopes of mountains, the Drit soil is on north-facing slopes, and the Roloc soil is on the upper part of south- and west-facing mountain slopes.

Included with these soils in mapping are about 3 percent Rock outcrop on ridges and 7 percent Shree soils on alluvial fans at the base of the mountain slopes (range site: 26-10). The included soils and Rock outcrop make up about 10 percent of mapped areas.

The Mottsville soil is very deep and excessively drained. It formed in alluvium derived dominantly from

granitic rock. Typically, the surface layer is grayish brown loamy coarse sand about 12 inches thick. The upper 39 inches of the underlying material is light brownish gray loamy sand and gravelly loamy sand. Below this to a depth of 60 inches is pale brown loamy sand.

Permeability of the Mottsville soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazards of water erosion and soil blowing are moderate.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony sandy loam about 15 inches thick. The next layer and the subsoil are very gravelly coarse sandy loam about 20 inches thick. The substratum to a depth of 60 inches is light yellowish brown extremely gravelly coarse sandy loam.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown and brown very gravelly sandy loam about 6 inches thick. The subsoil is brown very gravelly coarse sandy loam about 9 inches thick. Granitic bedrock is at a depth of 15 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. Sheet and rill erosion has moderately eroded this soil.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community of the Mottsville soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the steep slopes, very low available water capacity in the surface layer, and the sandy surface.

The potential plant community of the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and mountain brome. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very steep slopes and very low available water capacity of the surface layer.

The potential plant community of the Roloc soil is mainly Wyoming big sagebrush, green ephedra, desert needlegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, green ephedra, and desert needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The steepness of slope in areas of this association limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in less sloping areas of the Mottsville and Roloc soils. Because of the low and very low available water capacities and the competition from big sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing. Mechanical treatment is not practical on the Drit soil because the surface is commonly very stony and slopes are steep or very steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the moderately steep to very steep slopes. Special design of roads is needed to overcome the limitation of slope. The Roloc soil is moderately limited for roads because of depth to bedrock. The bedrock can be excavated with power equipment. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Mottsville soil is in capability subclass VIIs, nonirrigated, and range site 26-26. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-11.

611—Nevador fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the

average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray and pale brown fine sandy loam about 9 inches thick. The subsoil is pale brown clay loam about 15 inches thick. The substratum to a depth of 60 inches or more is pale brown fine sandy loam that has a few hard, firm durinodes.

Included with this soil in mapping are about 5 percent Updike Variant soils on lower alluvial fans (range site: 26-12) and 5 percent Dangberg soils, drained, on high terraces (range site: 26-12). The included areas make up about 10 percent of mapped areas.

Permeability of this Nevador soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development. Areas are well suited to irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of moderately low average annual precipitation and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good.

This soil is suited to urban development. It has only slight limitations.

Areas of this soil are limited for roads because of moderate frost heaving. Local roads and streets require a special base in some areas to avoid frost heave.

This soil is in capability subclass VIc, nonirrigated. It is in range site 26-16.

612—Nevador fine sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on smooth alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is about 5,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray fine sandy loam about 4 inches thick. The subsoil is brown clay loam about 20 inches thick. The substratum to a depth of 60 inches or more is pale brown fine sandy loam that has hard, firm durinodes. In some areas a gravelly substratum is below a depth of 40 inches.

Included with this soil in mapping is about 5 percent areas of soils that are flooded during high intensity storms.

Permeability of this Nevador soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing, wildlife habitat, and urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the moderately low average annual precipitation and competition from the sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good.

This soil is suited to urban development. It has only slight limitations.

Areas of this soil are limited for roads because of moderate frost heave. Local roads and streets require a special base in some areas to avoid frost heave damage. Access roads must be designed to provide adequate slope in cutbanks, and drains must be provided to control surface runoff and keep soil losses to a minimum.

This soil is in capability subclass VIc, nonirrigated. It is in range site 26-16.

621—Niwot loam. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived dominantly from granitic rock. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown and dark grayish brown loam about 15 inches thick. The underlying material to a depth of 60 inches is stratified, grayish brown sand and gravelly sand.

Included with this soil in mapping is about 5 percent areas of soils that are rarely flooded.

Permeability of this Niwot soil is moderate to a depth of 15 inches and very rapid below this depth. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3 feet from December through May. Runoff is very slow, and

the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat.

This soil is suited to hay and pasture. Occasional flooding, a limited supply of irrigation water, and the water table are the main limitations. Rate of application of irrigation water should be regulated to prevent a rise in the level of the water table. Wetness limits the choice of plants and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration.

Areas of this Niwot soil are limited for roads because of severe frost heaving and occasional flooding. Structures to protect this soil from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IVw, irrigated.

622—Niwot clay loam, clay substratum. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived dominantly from granitic rock. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay loam about 12 inches thick. The upper 28 inches of the underlying material is dark grayish brown sand and gravelly sand that has many distinct mottles. The lower part of the underlying material to a depth of 60 inches is grayish brown and gray clay that has many distinct mottles.

Included with this soil in mapping is about 5 percent areas of soils that are rarely flooded.

Permeability of this Niwot soil is mainly moderate, but it is slowly permeable in the lower part of the substratum. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional brief flooding in December through March.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat.

This soil is suited to hay and pasture. The main limitations are the seasonal high water table from December through May and the low available supply of irrigation water in summer. The rate of application of irrigation water should be regulated to prevent a rise in the water table. Wetness limits the choice of plants and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Grasses and legumes grow well if adequate fertilizer is used.

Areas of this soil are limited for roads because of occasional flooding and severe frost heaving. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures that protect this soil from flooding are difficult to establish and maintain. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IVw, irrigated.

631—Olac-Ister-Rock outcrop association. This association is on slopes of hills. Slope is 30 to 50 percent. Elevation is 4,200 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Olac very stony loam, 30 to 50 percent slopes, 25 percent Ister extremely stony sandy loam, 30 to 50 percent slopes, and 15 percent Rock outcrop. The Olac soil is on south-facing convex slopes, the Ister soil is on north-facing concave slopes, and Rock outcrop is on ridges and south-facing slopes.

Included with these soils in mapping are about 4 percent fine, montmorillonitic, mesic Aridic Argixerolls on concave south-facing slopes (range site: 26-25), 4 percent Rubble land on concave slopes below outcrops of Rock, and 2 percent Kram soils adjacent to thin scattered limestone outcrops (woodland site: Pinyon-juniper woodland). The included soils and Rubble land make up about 10 percent of mapped areas.

The Olac soil is shallow and well drained. It formed in residuum derived dominantly from volcanic flow rocks. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 3 inches thick. The subsoil is very pale brown extremely gravelly loam about 7 inches thick. Hard andesite bedrock is at a depth of 10 inches.

Permeability of the Olac soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 14 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Ister soil is moderately deep and well drained. It formed in residuum derived dominantly from basic igneous rock. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is grayish brown extremely stony sandy loam about 17 inches thick. The subsoil is dark brown and brown very stony clay loam about 21 inches thick. Hard andesite bedrock is at a depth of 38 inches.

Permeability of the Ister soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Olac soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the steep slopes and the shallow root zone with very low available water capacity.

The potential plant community on the Ister soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and basin wildrye. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the extremely stony surface and steep slopes.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Olac soil to produce vegetation suitable for grazing. Cattle generally avoid areas of this association unless fences restrict their movement. Because of the low and very low available water capacities and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Mechanical treatment is not practical, because the surface is stony and the slopes are steep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of steep slopes and the shallow depth to hard bedrock on the Olac soil. Special design is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Olac soil is in capability subclass VIIe, nonirrigated, and range site 26-25. The Ister soil is in capability subclass VIIs, nonirrigated, and range site 26-5. Rock outcrop is in capability subclass VIIIs, nonirrigated.

641—Ophir gravelly sandy loam, 0 to 2 percent slopes. This very deep, poorly drained soil is on toe slopes of alluvial fans. It formed in alluvium derived dominantly from granitic rock. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches is grayish brown, stratified gravelly coarse sand and loamy sand that has iron mottles.

Included with this soil in mapping is about 3 percent Mottsville soils on higher lying alluvial fans.

Permeability of this Ophir soil is rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3.5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development.

This soil is suited to hay and pasture. The main limitations are moderate depth to the seasonal high water table and low available water capacity. Application of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid raising the water table. Sprinkler and corrugation methods of irrigation are suitable. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Because of the moderate depth to water and underlying sandy material, cuts required for leveling should be less than 12 inches deep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The amount of molybdenum in the forage is sufficient to be toxic to livestock, although it does not affect plant production. Annual applications of nitrogen fertilizer are needed to maintain high quality irrigated pasture.

The main limitations for urban development are the moderately deep seasonal high water table, unstable sidewalls in cutbanks, and inadequate filtration of septic tank effluvent. Because the substratum is rapidly permeable, special design is needed in places to avoid pollution of the ground water or nearby water supplies. Drainage should be provided for buildings with basements and crawl spaces. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness.

Areas of this soil are limited for roads because of moderate depth to the seasonal high water table and moderate frost heaving. Roads should be provided with adequate surface drainage. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass IIIw, irrigated.

642—Ophir gravelly sandy loam, 2 to 8 percent slopes. This very deep, poorly drained soil is on toe slopes of alluvial fans. It formed in alluvium derived dominantly from granitic rock. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches is stratified, dark gray and grayish brown gravelly loamy coarse sand, gravelly sandy loam, and gravelly loamy sand with iron mottles. Some areas are at a slightly higher elevation and the soil is colder than normal for Ophir soils.

Included with this soil in mapping is about 3 percent Mottsville soils on higher lying alluvial fans.

Permeability of this Ophir soil is rapid. Available water capacity is low. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3.5 feet from December through May. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development.

This soil is suited to hay and pasture. The main limitations are moderate depth to the seasonal high water table, low available water capacity, and gentle or moderate slopes. Application of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid raising the water table. The sprinkler and corrugation methods of irrigation are suitable. Because this soil is droughty, light and frequent applications of irrigation water are needed. If corrugation irrigation is used, runs should be on the contour or across the slope. Pipe, ditch lining, or drop structures should be installed in irrigation ditches to facilitate irrigation and prevent excessive ditch erosion. Leveling helps to insure the uniform application of water. Because of the moderate depth to water and underlying sandy material, cuts required for leveling should be less than 12 inches deep. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The amount of molybdenum in the forage produced on this soil is sufficient to be toxic to livestock, although it does not affect productivity. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

The main limitations for urban development are the moderately deep seasonal high water table, unstable sidewalls of cutbanks, and inadequate filtration of septic tank effluent. Because the substratum is rapidly permeable, special design is needed in places to avoid polluting ground water or nearby water supplies. Drainage should be provided for buildings with basements and crawl spaces. Cutbanks are not stable and are subject to slumping. Septic tank absorption fields do not function properly because of wetness.

Areas of this soil are limited for roads because of the moderately deep seasonal high water table and moderate frost heaving. Roads should be provided with adequate surface drainage. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass IIIw, irrigated.

644—Ophir Variant peat, 2 to 4 percent slopes. This very deep, very poorly drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rock. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average annual frost-free period is about 100 days.

Typically, the surface layer is very dark gray peat about 7 inches thick. Below this is dark gray gravelly sandy loam about 10 inches thick. The underlying material to a depth of 60 inches is stratified, dark gray gravelly sandy loam and loamy sand with iron mottles. A few small areas are nearly level or moderately sloping.

Included with this soil in mapping is 5 percent Ophir soils on the slightly higher positions.

Permeability of this Ophir Variant soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table within a depth of 1.5 feet from December through August. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for irrigated pasture and wildlife habitat.

This soil is poorly suited to pasture. The main limitation is the shallow seasonal high water table. Wetness limits the choice of plants, limits the periods of grazing, and increases the risk of winterkill. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. The amount of molybdenum in the forage produced on this soil is sufficient to be toxic to livestock, although it does not affect plant production. The use of equipment is limited by wetness.

Areas of this soil are limited for roads because of shallow depth to water and the severe frost heave. Local roads and streets need drainage and in some areas require a special base to avoid frost heave damage.

This soil is in capability subclass Vw, irrigated.

651—Oppio-Nosrac association. This association is on slopes of mountains. Slope is 30 to 50 percent. Elevation is 6,000 to 7,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Oppio very stony fine sandy loam, 30 to 50 percent slopes, and 25 percent Nosrac stony clay loam, 30 to 50 percent slopes. The Oppio soil is on south- and west-facing side slopes, and the Nosrac soil is on north- and east-facing side slopes.

Included with these soils in mapping are about 7 percent very cobbly Deven soils on ridges (range site: 26-23) and 8 percent Cagle soils on upper side slopes (woodland site: Pinyon-juniper woodland). The included soils make up about 15 percent of mapped areas.

The Oppio soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is light brownish gray very stony fine sandy loam about 5 inches thick. The subsoil is brown and pale brown gravelly clay about 25 inches thick. Andesite bedrock is at a depth of 30 inches.

Permeability of the Oppio soil is slow. Available water capacity is moderate. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony clay loam about 8 inches thick. The upper part of the subsoil is brown very gravelly loam and very gravelly clay loam about 27 inches thick, and the lower part to a depth of 60 inches or more is brown and very pale brown gravelly loam and very gravelly loam. The subsoil averages very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Oppio soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes and the presence of highly expandable clay in the Oppio soil. Roads need to be located on the less sloping areas if possible to avoid excessive cutting and filling. Roads on the Oppio soil are difficult to maintain because of the clay, which has low strength when wet. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

The Oppio soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

661—Ormsby loamy sand. This very deep, somewhat poorly drained soil is on terraces. It formed in alluvium derived dominantly from granite, andesite, and rhyolite. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray loamy sand about 16 inches thick. The underlying material to a depth of 60 inches is light brownish gray gravelly coarse sand. Weak silica cementation occurs between depths of 24 and 52 inches.

Included with this soil in mapping is about 5 percent mixed, mesic Durorthidic Xeropsamments on slightly higher alluvial fans.

Permeability of this Ormsby soil is moderately rapid. Available water capacity is very low. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff is very slow. The hazard of soil blowing is moderate. This soil is subject to rare flooding.

Most areas of this soil are used for irrigated crops and wildlife habitat. A few areas are used for urban development.

This soil is suited to irrigated crops. The main limitation is the very low available water capacity. The furrow, sprinkler, and corrugation methods of irrigation are suitable. Application of irrigation water should be regulated to prevent a rise in the present water table. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Leveling cuts should be limited to a depth of less than 18 inches

because of the presence of weak cementation in the underlying material. If this soil is left bare for extended periods, field windbreaks help to control soil blowing and conserve moisture. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and the deep seasonal high water table. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control soil blowing. Buildings should be located above the expected flood level. Major flood control structures help to control flooding. The high water table increases the possibility of failure of septic tank absorption fields.

Areas of this soil are limited for roads because of rare flooding and moderate frost heaving. Structures that protect this soil from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage. During prolonged dry periods, roads are difficult to maintain because of the presence of loose sand which results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass IVw, irrigated.

662—Ormsby gravelly loamy coarse sand. This very deep, somewhat poorly drained soil is on river terraces. It formed in alluvium derived from granite, andesite, and rhyolite. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray and dark grayish brown gravelly loamy coarse sand about 16 inches thick. The underlying material to a depth of 60 inches is light brownish gray gravelly coarse sand. Weak silica cementation occurs between depths of 24 and 52 inches. In some small areas about 1 mile east of Genoa, the soil is slightly saline-alkali.

Included with this soil in mapping is about 3 percent Ormsby soils that are in swales and have a seasonal high water table at a depth of 2 to 3 feet.

Permeability of this Ormsby soil is moderately rapid. Available water capacity is very low. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for irrigated crops. A few areas are used for urban development.

This soil is suited to hay and irrigated crops. The main limitation is very low available water capacity. Irrigation water can be applied by the furrow, sprinkler, and corrugation methods. Application of irrigation water should be regulated to prevent a rise in the present water table. Because this soil is droughty, light and frequent applications of irrigation water are needed. Leveling helps to insure the uniform application of water. Leveling cuts should be limited to a depth of less than 18 inches because of weak cementation in the underlying material. Crops respond to nitrogen and phosphorous fertilizers.

The main limitations for urban development are rare flooding, unstable sidewalls in cutbanks, and the deep seasonal high water table. Septic tank absorption fields do not function properly because of the seasonal high water table. Buildings should be located above the expected flood level.

Areas of this soil are moderately limited for roads because of rare flooding and moderate frost action. Structures that protect this soil from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IVw, irrigated.

671—Pernty-Burnborough Variant-Chen association. This association is on pediments of mountains. Slope is 2 to 15 percent. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 75 days.

This association is 45 percent Pernty very gravelly loam, 2 to 15 percent slopes, 25 percent Burnborough Variant stony loam, 4 to 15 percent slopes, and 15 percent Chen very cobbly loam, 2 to 8 percent slopes. The Pernty soil is on convex south-facing slopes and tops of ridges, the Burnborough Variant soil is on concave north- and east-facing slopes, and the Chen soil is on slightly concave crests.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and 10 percent Burnborough soils on foot slopes (range site: 26-5). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Pernty soil is shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface layer is gray very gravelly loam about 5 inches thick. The subsoil is gray very gravelly loam about 10 inches thick. Fractured metavolcanic bedrock is at a depth of 15 inches.

Permeability of the Pernty soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Burnborough Variant soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, the surface layer is covered with about 2 percent stones. The surface layer

is dark grayish brown stony loam about 19 inches thick. The subsoil is brown gravelly clay loam about 16 inches thick. Weathered metavolcanic bedrock is at a depth of 35 inches.

Permeability of the Burnborough Variant is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chen soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface layer is grayish brown very cobbly loam about 5 inches thick. The subsoil is brown extremely gravelly clay about 9 inches thick. Hard andesite bedrock is at a depth of 14 inches.

Permeability of the Chen soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pernty soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and bottlebrush squirreltail with invasion of pinyon pine. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the shallow rooting depth and very low available water capacity.

The potential plant community on the Burnborough Variant soil is mainly mountain big sagebrush, antelope bitterbrush, Columbia needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, mountain brome, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are surface stones and the low available water capacity.

The potential plant community on the Chen soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, Sandberg bluegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are shallow rooting depth and very low available water capacity.

The cold soil temperatures limit plant growth in areas of this association. Grazing therefore should be delayed until the soil has warmed up and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the low and very low available water capacities and the competition from sagebrush, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads because of shallow depth to bedrock on the Pernty and Chen soils. Moderate limitations for roads are the strong slopes, moderate frost heave, and the moderate content of highly expandable clay in the Burnborough Variant soil. Deep cuts should be avoided, especially on the Pernty and Chen soils, because of the underlying bedrock. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pernty soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Burnborough Variant soil is in capability subclass VIs, nonirrigated, and range site 26-40. The Chen soil is in capability subclass VIIs, nonirrigated, and range site 26-28.

672—Pernty-Burnborough-Glean association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 7,200 to 8,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 75 days.

This association is 40 percent Pernty very stony loam, 15 to 30 percent slopes, 25 percent Burnborough stony loam, 30 to 50 percent slopes, and 20 percent Glean very stony loam, 15 to 50 percent slopes. The Pernty soil is on convex ridges and shoulders, the Burnborough soil is on north- and east-facing convex side slopes, and the Glean soil is on concave side slopes and toe slopes.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and spurs, 5 percent Searles soils on lower west-facing slopes (woodland site: Pinyon-juniper woodland), and 5 percent very cobbly Chen soils that have a claypan and are intermingled with the Pernty soils on ridges (range site: 26-28). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Pernty soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 5 to 10 percent stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil to a depth of 19 inches is dark brown very cobbly clay loam. Hard andesite bedrock is at a depth of 19 inches.

Permeability of the Pernty soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is

14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 10 inches thick. The subsoil to a depth of 60 inches or more is pale brown very gravelly clay loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface layer is covered with 3 to 15 percent stones. The surface layer is dark grayish brown very stony loam about 2 inches thick. The upper 21 inches of the underlying material is dark grayish brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is dark grayish brown very cobbly loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Pernty soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are surface stones, the very low available water capacity, and shallow depth to bedrock. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting trees can be used. Plant competition and the very low available water capacity delay natural regeneration but do not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The potential plant community on the Glean soil is mainly mountain big sagebrush, spike fescue, western needlegrass, and basin wildrye. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, curlleaf mountainmahogany, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Glean soil. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Because of moderate and low available water capacities and the competition from sagebrush and curlleaf mountainmahogany, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads because of strongly sloping and steep soils and because of shallow depth to bedrock on the Pernty soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Pernty soil. Roads need to be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

The Pernty soil is in capability subclass VIIe, nonirrigated. The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38.

673—Pernty-Burnborough-Rock outcrop association. This association is on slopes of mountains. Slope is 50 to 75 percent. Elevation is 6,000 to 8,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 75 days.

This association is 40 percent Pernty very stony loam, 50 to 75 percent slopes, 25 percent Burnborough very stony loam, 50 to 75 percent slopes, and 20 percent Rock outcrop. The Pernty soil is on convex ridges and shoulders, the Burnborough soil is on side slopes, and Rock outcrop is on ridges and spurs.

Included with these soils in mapping are about 10 percent loamy-skeletal, mixed, frigid Typical Haploxerolls on steep, north-facing slopes (range site: 26-38) and 5 percent Rubble land below outcrops of rock on side slopes. The included soils and Rubble land make up about 15 percent of mapped areas.

The Pernty soil is shallow and well drained. It formed in residuum derived dominantly from andesite and metavolcanic rock. Typically, the surface is covered with about 3 to 15 percent stones. The surface layer is dark

grayish brown very stony loam about 4 inches thick. The subsoil is brown very gravelly clay loam about 15 inches thick. Hard bedrock is at a depth of 19 inches.

Permeability of the Pernty soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite and metavolcanic rock. Typically, the surface is covered with about 3 to 15 percent rock. The surface layer is grayish brown very stony loam about 7 inches thick. The subsoil to a depth of 60 inches or more is pale brown very gravelly clay loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Pernty soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity, very steep slopes, very stony surface, and shallow depth to bedrock. Stones on the surface and very steep slopes can interfere with the use of equipment. Plant competition and very low available water capacity delay natural regeneration but do not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very steep slopes.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Because of the density of pinyon and juniper in most areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of the very steep slopes, outcrops of rock, and shallow depth to bedrock on the Pernty soil. Because of the bedrock, deep cuts should be avoided, especially on the Pernty soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pernty soil is in capability subclass VIIe, nonirrigated. The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. Rock outcrop is in capability subclass VIIIs, nonirrigated.

681—Phing sandy loam, 4 to 8 percent slopes. This very deep, well drained, slowly permeable soil is on the tops and side slopes of terraces. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,200 to 5,600 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the frost-free period is about 100 days.

Typically, the surface layer is gray sandy loam about 2 inches thick. The subsoil is brown clay about 25 inches thick. The upper 17 inches of the substratum is very pale brown loam that is weakly silica-cemented. The lower part of the substratum to a depth of 60 inches is very pale brown loam that is strongly effervescent.

Included with this soil in mapping are about 6 percent Haybourne soils on inset alluvial fans (range site: 26-16), 4 percent Brockliss Variant soils, drained, on edges of drainageways (range site: 26-30), and about 5 percent Puett soils on terrace side slopes (range site: 26-29). The included soils make up about 15 percent of mapped areas.

Permeability of this Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clay subsoil. Because of the thin surface layer and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more

desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Roads should be designed to provide surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

682—Phing cobbly sandy loam, 4 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown cobbly sandy loam about 9 inches thick. The subsoil is brown and yellowish brown clay about 22 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown and brown clay and silty clay loam that is weakly silica cemented.

Included with this soil in mapping is about 2 percent soils in which the surface layer is clay and soils that are nearly level.

Permeability of this Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the thin surface layer over a clay subsoil and the moderately low average annual precipitation.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be designed to provide surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

683—Phing gravelly loam, 0 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray gravelly loam about 4 inches thick. The subsoil is dark brown clay about 34 inches thick. The substratum to a depth of 60 inches or more is pinkish gray loam. In some areas the surface is very cobbly.

Included with this soil in mapping is about 3 percent soils in which 25 to 75 percent of the original surface has been removed by sheet and rill erosion.

Permeability of this Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low average annual precipitation and thin surface layer over a clay subsoil. Because of the thin surface layer and competition from the sagebrush for moisture, desirable grasses are very slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be designed to provide surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

685—Phing-Chalco-Uhaldi association. This association is on strongly sloping to steep, dissected tops and side slopes of terraces. Slopes are 8 to 50 percent. Elevation is 5,600 to 6,600 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Phing very gravelly loam, 8 to 15 percent slopes, 25 percent Chalco gravelly fine sandy loam, 8 to 15 percent slopes, and 20 percent Uhaldi stony loam, 30 to 50 percent slopes. The Phing soil is on terrace tops and south- and west-facing side

slopes, the Chalco soil is on terrace edges, and the Uhaldi soil is on north- and east-facing terrace side slopes.

Included with these soils in mapping are about 2 percent Shree soils on old alluvial fans at terrace bases (range site: 26-10), 5 percent Indian Creek soils on lower terrace slopes (range site: 26-25), 5 percent Puett soils in eroded areas on terrace side slopes (range site: 26-29), 2 percent Indian Creek Variant soils on terrace top slopes (range site: 26-10), and 1 percent outcrops of Tertiary mudstone on terrace side slopes. The included soils make up about 15 percent of mapped areas.

The Phing soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. The surface layer is light brownish gray very gravelly loam about 4 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 60 inches or more is pale brown loam. In some areas slope is 15 to 30 percent.

Permeability of the Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. The surface layer is pale brown gravelly fine sandy loam about 4 inches thick. The subsoil is pale brown clay about 13 inches thick. Weathered Tertiary mudstone is at a depth of 17 inches. In some areas slope is 2 to 8 percent.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is brown stony loam about 8 inches thick. The subsoil is light yellowish brown gravelly clay loam about 27 inches thick. Weathered mudstone is at a depth of 35 inches. In some areas slope is more than 50 percent.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is moderate. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of these soils are used for livestock grazing and wildlife habitat.

The potential plant community on the Phing soil is mainly low sagebrush, bottlebrush squirreltail, and Thurber needlegrass. The present vegetation in most areas is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The limitations for seeding are the moderately low average annual precipitation and a thin very gravelly surface layer over a clay subsoil.

The potential plant community on the Chalco soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Thurber needlegrass. The production of vegetation suitable for grazing is limited by the moderately low annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The steepness of the slope limits access and movement of livestock. Livestock grazing should be managed to prevent overgrazing in the less sloping areas of Phing and Chalco soils. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing.

Areas of this association are limited for roads because of the presence of highly expandable clay in the Phing and Chalco soils and because of steep slopes on the Uhaldi soil. The roads are difficult to maintain because the clay has low strength when wet. Special design is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Phing soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Chalco soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Uhaldi soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

691—Updike Variant loam. This very deep, moderately well drained soil is on flood plains. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light gray loam about 4 inches thick. The subsoil is pale brown and brown clay loam about 37 inches thick. The lower part of the subsoil and the substratum to a depth of 60 inches or more are light brownish gray and light yellowish brown loam and fine sandy loam.

Included with this soil in mapping are about 5 percent Updike soils on alluvial fans (range site: 26-12) and 5 percent Greenbrae soils on toe slopes of alluvial fans (range site: 26-16). The included soils make up about 10 percent of mapped areas.

Permeability of this Updike Variant soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding. The surface layer and substratum are slightly affected by salt and alkali, and the subsoil is strongly affected.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat.

The potential plant community on this soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, creeping wildrye, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the strongly saline-alkali subsoil and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkali subsoil. Because of the saline-alkali soil condition and the competition from shrubs for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding and moderately slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of moderately slow permeability in the subsoil.

Areas of this soil are limited for roads because of the low strength. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-12.

693—Updike Variant-Playas association. This association is on terraces and playas. Slope is 0 to 2 percent. Elevation is 5,200 to 5,300 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average annual frost-free period is about 100 days.

This association is 45 percent Updike Variant sandy loam and 35 percent Playas. The Updike Variant soil is on terraces surrounding the playas. Playas are in the lowest part of basins.

Included with this soil in mapping are about 5 percent Updike soils, flooded, on the perimeter of playas (range site: 26-36), 5 percent Voltaire soil in drainageways (range site: 26-2), 4 percent Haybourne soils on alluvial fans (range site: 26-16), 1 percent mixed, mesic Typic Torriorthents on dunes (range site: 27-16), and 5 percent Updike soils, flooded, on terraces above playas (range site: 26-36). The included soils make up about 20 percent of mapped areas.

The Updike Variant soil is very deep and moderately well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface layer is pale brown sandy loam about 6 inches thick. The subsoil is pale brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is pale brown loam and fine sandy loam.

Permeability of the Updike Variant soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding. The surface layer and substratum are slightly affected by salt and alkali, and the subsoil is strongly affected.

Playas consist of nearly level lake plains that occupy the lowest parts of closed depressions. They are barren and support practically no vegetation. Playas are commonly dry but are subject to temporary flooding by runoff from surrounding areas. Deposits in playas are fine grained and in some places are characterized by a high water table and saline conditions.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Updike Variant soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The production of vegetation suitable for livestock grazing is limited by a strongly saline-alkali subsoil and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkali subsoil. Because of the saline-alkali soil condition and the competition from greasewood and sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable

forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of low strength in the Updike Variant soil and frequent flooding on the Playas. Playas should not be selected as a site for roads if an alternate site can be used. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

The Updike Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-12. Playas are in capability subclass VIIIw, nonirrigated.

702—Perazzo gravelly loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from andesite and granitic rock. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 51 degrees F., and the average frost-free period is about 120 days.

Typically, the surface layer is light gray gravelly loam about 4 inches thick. The subsoil is yellowish brown and about 11 inches thick. It averages very gravelly sandy clay loam. The upper 17 inches of the substratum is yellowish brown extremely gravelly sandy loam, and the lower part to a depth of 60 inches is brown extremely gravelly loamy sand.

Included with this soil in mapping are about 8 percent Veta soils in drainageways (range site: 26-34) and 4 percent Rawe soils on remnants of older fans (range site: 27-18). The included soils make up about 12 percent of mapped areas.

Permeability of this Perazzo soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Bailey greasewood, shadscale, bud sagebrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil have only slight limitations for local streets and roads. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-18.

712—Prey gravelly loamy sand, 0 to 4 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite, other igneous rock, and gneiss. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown gravelly loamy sand about 13 inches thick. The subsoil is brown gravelly coarse sandy loam about 17 inches thick. Below this is a strongly silica-cemented hardpan about 5 inches thick. The substratum to a depth of 60 inches or more is light gray loamy coarse sand that is weakly silica cemented. In some areas, the surface layer is not gravelly.

Included with this soil in mapping is about 5 percent moderately steep and steep Prey soils on edges of terraces.

Permeability of this Prey soil is moderately rapid above the hardpan. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 26 to 38 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. Some areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy surface layer and the very low available water capacity. Because of the low available water capacity, grasses are slow to recover even if management is good. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing needs to be managed to protect the soil from excessive erosion.

The main limitations for urban development are the moderately deep, strongly cemented hardpan, poor filtration of septic tank effluent, and unstable sidewalls in cutbanks. The hardpan is rippable, and therefore it is not a serious limitation for most engineering uses. The suitability of this soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Community sewer systems are needed in areas of moderate to high density housing to prevent

contamination of water supplies as the result of seepage. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of the moderate frost heaving. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

713—Prey stony sandy loam, 4 to 15 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite, other igneous rock, and gneiss. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown stony sandy loam about 9 inches thick. The subsoil is brown gravelly coarse sandy loam about 21 inches thick. Below this is a strongly silica-cemented hardpan about 5 inches thick. The substratum to a depth of 60 inches or more is light gray loamy coarse sand.

Included with this soil in mapping is about 5 percent Prey soils that are nearly level to gently sloping along the lower edges of mapped areas.

Permeability of this Prey soil is moderately rapid above the hardpan. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 26 to 38 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. Some areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the very low available water capacity. Because of the very low available water capacity and the competition from sagebrush for moisture, desirable grasses are slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soil from excessive erosion.

The main limitations for urban development are the moderately deep, strongly cemented hardpan, strong slopes, poor filtration of septic tank effluent, and unstable sidewalls in cutbanks. The hardpan is rippable, and therefore it is not a serious limitation for most engineering uses. The suitability of this soil for septic tank fields can be improved by ripping the hardpan to increase permeability. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Community sewer systems are needed in moderate to high density housing to prevent contamination of water supplies by seepage. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of moderately steep slopes and moderate frost heave. Local roads and streets require a special base in some areas to avoid frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

721—Prey Variant stony loam, 2 to 15 percent slopes. This shallow, well drained soil is on dissected terraces. It formed in alluvium derived dominantly from granite, gneiss, and slate. Elevation is about 5,200 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 10 inches thick. The subsoil is brown gravelly sandy loam and gravelly loam about 5 inches thick. Below this is an indurated, silica-cemented hardpan about 7 inches thick. The substratum to a depth of 60 inches is stratified and weakly silica-cemented. It averages very gravelly fine sandy loam.

Included with this soil in mapping is about 5 percent Prey soils that are along the lower edges of mapped areas.

Permeability of this Prey Variant soil is moderate above the duripan. Available water capacity is very low. Effective rooting depth coincides with depth to the hardpan. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor.

The main limitation for seeding is the very low available water capacity. Because of the very low available water capacity and the competition from the sagebrush for moisture, desirable grasses are slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the unit to produce vegetation suitable for grazing.

The main limitation for urban development is the shallow, silica-cemented hardpan. The hardpan is rippable, and therefore it is not a serious limitation for most engineering uses. The suitability of this soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour.

Areas of this soil are moderately limited for roads because of moderate frost heaving, a shallow hardpan, and strong slopes. The hardpan is rippable. Local roads and streets require a special base in some areas to avoid frost heave damage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed. Roads should be provided with adequate surface drainage. Cutting and filling can be reduced by building roads in the less sloping areas.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

731—Job Variant silt loam. This very deep, somewhat poorly drained soil is on low terraces. It formed in alluvium derived dominantly from granite, basalt, rhyolite, gneiss, sandstone, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is white, gypsiferous silt loam about 7 inches thick. The underlying material to a depth of 60 inches is white, gypsiferous silt loam. Gypsum nodules are below a depth of 46 inches.

Included with this soil in mapping is about 5 percent areas of soils that are poorly drained in swales.

Permeability of this Job Variant soil is moderate. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 4 feet from September through June. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding in December through March. This soil is strongly saline-alkali affected throughout.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly black greasewood, big saltbrush, alkali sacaton, and inland saltgrass. The present vegetation in most areas is mainly black greasewood and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the strongly saline-alkali soil condition and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkaline condition. Because of this limitation and the competition from greasewood for moisture, desirable grasses are very slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of occasional flooding and severe frost heaving. Structures to protect this soil from flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads on this soil require an adequate wearing surface to limit maintenance costs and reduce the dust hazard when the soil is dry. Roads require adequate surface drainage.

This soil is in capability subclass VIIw, nonirrigated. It is in range site 26-21.

741—Puett-Chalco association. This association is on side slopes and the narrow tops of terraces. Slope is 8 to 50 percent. Elevation is 5,800 to 6,400 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 95 days.

This association is 55 percent Puett gravelly fine sandy loam, 30 to 50 percent slopes, 15 percent Chalco very cobbly loam, 15 to 30 percent slopes, eroded, and 15 percent Chalco very cobbly loam, 8 to 15 percent slopes. The Puett soil is on steep terrace ridges and eroded terrace side slopes; the Chalco soil, 15 to 30 percent slopes, eroded, is on terrace shoulders; and the Chalco soil, 8 to 15 percent slopes, is on terrace tops.

Included with these soils in mapping are about 5 percent Tertiary mudstone on side slopes, 7 percent Greenbrae soils on alluvial fans at terrace bases (range site: 26-16), 2 percent Brockliss Variant soils on inset alluvial fans (range site: 26-30), and 1 percent Brockliss Variant soils adjacent to springs (range site: 26-3). The included soils and outcrops of rock make up about 15 percent of mapped areas.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from mudstone. Typically, the surface layer is light gray gravelly fine sandy loam about 3 inches thick. The underlying material is light gray fine sandy loam about 7 inches thick. Tertiary mudstone is at a depth of 10 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate.

The Chalco soil, 15 to 30 percent slopes, eroded, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is very cobbly loam about 3 inches thick. The subsoil is pale brown clay about 10 inches thick. Tertiary mudstone is at a depth of 13 inches. Moderate rill and sheet erosion has removed between 25 and 75 percent of the original topsoil.

Permeability of the Chalco soil, 15 to 30 percent slopes, eroded, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Chalco soil, 8 to 15 percent slopes, is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is gravelly fine sandy loam about 4 inches thick. The subsoil is pale brown clay about 12 inches thick. Tertiary mudstone is at a depth of 16 inches.

Permeability of the Chalco soil, 8 to 15 percent slopes, is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Puett soil is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Indian ricegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Chalco soil, 15 to 30 percent slopes, eroded, is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and the thin surface layer over a clay subsoil.

The potential plant community on the Chalco soil, 8 to 15 percent slopes, is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are very low available water capacity and the thin surface layer over a clay subsoil.

Because of the lack of a seed source and the competition from sagebrush and trees for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Chalco soils. Loss of the surface layer results in a severe decrease in productivity and in the potential of the unit to produce vegetation suitable for grazing. Because of the density of pinyon and juniper in some areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes and because of the highly expandable clay in the Chalco soils. The clay has low strength when wet. Roads need to be designed to provide a stable base and an adequate wearing surface to improve trafficability on the Chalco soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Deep cuts should be avoided on all soils in this association because of the underlying mudstone bedrock. Access roads should be designed to control surface runoff. Special design for roads is needed to overcome the limitation of slope.

The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29. The Chalco soil, 15 to 30 percent slopes, eroded, is in capability subclass VIIe, nonirrigated, and range site 26-29. The Chalco soil, 8 to 15 percent slopes, is in capability subclass VIIs, nonirrigated, and range site 26-25.

742—Puett-Chalco-Pula complex, 30 to 50 percent slopes. This complex is on dissected terraces that have narrow ridgelike tops. Elevation is 5,800 to 6,200 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This complex is 35 percent Puett gravelly fine sandy loam, 30 to 50 percent slopes, 25 percent Chalco very cobbly loam, 30 to 50 percent slopes, and 25 percent Pula very gravelly loam, 30 to 50 percent slopes, eroded.

The Puett soil is on terrace side slopes, and the Chalco and Pula soils are on terrace toe slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent Greenbrae soils on alluvial fans at the base of terraces (range site: 26-16), 5 percent Haybourne soils on inset alluvial fans, (range site: 26-16), and 5 percent outcrops of Tertiary mudstone on terrace side slopes. The included soils and outcrops of rock make up about 15 percent of mapped areas.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from mudstone. Typically, the surface layer is light gray gravelly fine sandy loam about 3 inches thick. The underlying material is light brownish gray sandy loam about 7 inches thick. Tertiary mudstone is at a depth of 10 inches. In some small areas, mudstone is at a depth of less than 10 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from mudstone. Typically, the surface is covered with 10 to 20 percent cobbles. The surface layer is brown very cobbly loam about 4 inches thick. The subsoil is dark brown clay about 11 inches thick. Tertiary mudstone is at a depth of 15 inches. In some small areas slopes are 15 to 30 percent.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from mudstone. Typically, the surface layer is grayish brown very gravelly loam about 2 inches thick. The subsoil is grayish brown extremely gravelly clay and very gravelly clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown extremely gravelly sandy clay loam. The soil is moderately eroded by sheet and rill erosion.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this complex are used for livestock grazing and wildlife habitat.

The potential plant community on the soils in this complex is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, purple sage, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of the soils for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity of the Puett and Chalco soils. Because of the very low available water capacity and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if management is good.

The steepness of slope limits access and movement of livestock in areas of this complex. Livestock grazing should be managed to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Puett and Chalco soils to produce vegetation suitable for grazing.

Areas of this complex are limited for roads because of steep slopes and the presence of highly expandable clay with low strength in the Chalco soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIe, nonirrigated. It is in range site 26-29.

743—Puett-Verdico-Haybourne association. This association is on side slopes and tops of terraces and on alluvial fans. Slope is 4 to 50 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Puett gravelly fine sandy loam, 30 to 50 percent slopes, 25 percent Verdico very gravelly loam, 4 to 8 percent slopes, and 15 percent Haybourne loam, 4 to 8 percent slopes. The Puett soil is on side slopes of terraces, the Verdico soil is on tops of terraces, and the Haybourne soil is on alluvial fans at the base of terraces.

Included with these soils in mapping are about 5 percent Saralegui soils on inset alluvial fans (range site: 26-16) and 5 percent outcrops of Tertiary mudstone on side slopes of terraces. The included soils and outcrops of rock make up about 10 percent of mapped areas.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray gravelly fine sandy loam about 3 inches thick. The underlying material to a depth of 15 inches is light brownish gray

fine sandy loam and loamy fine sand. Tertiary mudstone is at a depth of 18 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Verdico soil is moderately deep and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray very gravelly loam about 4 inches thick. The subsoil is pale brown clay about 17 inches thick. The substratum is pale brown gravelly clay about 14 inches thick. Tertiary mudstone is at a depth of 35 inches.

Permeability of the Verdico soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Haybourne soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is brown loam about 6 inches thick. The subsoil is brown fine sandy loam about 25 inches thick. The substratum is pale brown, stratified fine sandy loam and gravelly coarse sand to a depth of 60 inches.

Permeability of the Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

Areas of this association are used for livestock grazing and wildlife habitat. The Haybourne soil is suited to irrigated crops.

The potential plant community on the Puett soil is mainly Wyoming big sagebrush, antelope bitterbrush, Indian ricegrass, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, purple sage, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes.

The potential plant community on the Verdico soil is mainly low sagebrush, Thurber needlegrass, Canby bluegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, bottlebrush squirreltail, and Canby bluegrass. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clay subsoil.

The potential plant community on the Haybourne soil is mainly Wyoming big sagebrush, Anderson peachbrush, Indian ricegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation.

Seeding large areas of Haybourne soil is difficult. This is because of the pattern in which the Haybourne soil occurs with the Puett and Verdico soils. Because of very low to moderate available water capacities and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access and movement of livestock. If livestock are restricted to this association, they tend to graze the Haybourne soil on the alluvial fans, leaving the Puett soils on terrace side slopes and Verdico soils on the terrace tops essentially ungrazed. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Puett and Verdico soils to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of steep slopes on the Puett soil and highly expandable clays with low strength in the Verdico soil. Rare flooding and moderate frost heaving are moderate limitations on the Haybourne soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29. The Verdico soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Haybourne soil is in capability subclass VIs, nonirrigated, and range site 26-16.

744—Puett-Verdico-Uhaldi association. This association is on side slopes and high terraces. Slope is 4 to 50 percent. Elevation is 5,800 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 45 percent Puett gravelly fine sandy loam, 30 to 50 percent slopes, 25 percent Verdico very gravelly loam, 4 to 8 percent slopes, and 15 percent Uhaldi stony loam, 30 to 50 percent slopes. The Puett

soil is on south-facing slopes of terraces, the Verdico soil is on tops of terraces, and the Uhaldi soil is on north-facing side slopes of terraces.

Included with these soils in mapping are about 5 percent Shree soils on alluvial fans at the base of terraces (range site: 26-10), 5 percent deep Pula soils on steep, concave south-facing slopes (range site: 26-10), and 5 percent outcrops of Tertiary mudstone on steep side slopes of terraces. The included soils and outcrops of rock make up about 15 percent of mapped areas.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray gravelly fine sandy loam about 2 inches thick. The underlying material to a depth of 14 inches is light brownish gray fine sandy loam. Tertiary mudstone is at a depth of 16 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Verdico soil is moderately deep and well drained. It formed in residuum dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray very gravelly loam about 3 inches thick. The subsoil is pale brown clay about 27 inches thick. Tertiary mudstone is at a depth of 30 inches. In some small areas the surface layer is stony.

Permeability of the Verdico soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion and soil blowing are slight.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 8 inches thick. The subsoil is brown gravelly clay loam about 22 inches thick. Tertiary mudstone is at a depth of 30 inches. In some small areas, more than 75 percent of the original topsoil has been removed by severe sheet and rill erosion.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to mudstone. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Puett soil is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and desert needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The potential plant community on the Verdico soil is mainly low sagebrush, Thurber needlegrass, Canby bluegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clay subsoil.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Verdico soil. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Puett and Verdico soils to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of steep slopes on the Puett and Uhaldi soils and highly expandable clays with low strength on the Verdico soils. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29. The Verdico soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Uhaldi soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

751—Pula-Cassiro association. This association is on side slopes of terraces. Slope is 15 to 30 percent. Elevation is 6,000 to 7,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Pula very stony loam, 15 to 30 percent slopes, and 35 percent Cassiro stony loam, 15 to 30 percent slopes. The Pula soil is on south- and west-facing terrace slopes, and the Cassiro soil is on north- and east-facing terrace slopes.

Included with these soils in mapping are about 8 percent Springmeyer soils on alluvial fans and stream terraces at the base of terrace side slopes (range site: 26-10) and 7 percent Phing Variant soils on broad ridges along the tops of the terrace side slopes (range site: 26-42). The included soils make up about 15 percent of mapped areas.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 3 to 15 percent stones. The surface layer is light brownish gray very stony loam about 4 inches thick. The subsoil is brown extremely gravelly clay about 20 inches thick. The substratum to a depth of 60 inches is very pale brown extremely gravelly sandy clay loam.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Cassiro soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown stony loam about 8 inches thick. The subsoil is brown very gravelly clay about 34 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, stratified gravelly sandy loam to very cobbly clay loam.

Permeability of the Cassiro soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pula soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity in the surface layer.

The potential plant community on the Cassiro soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are moderately steep slopes and the low available water capacity in the surface layer.

Seeding large areas of the Cassiro soil is difficult. This is because of the pattern in which this soil occurs with the Pula soil. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Because of the density of pinyon and juniper in some areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep slopes. Special design of roads is needed to overcome the limitations of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce the maintenance costs. Roads should be designed to provide adequate surface drainage.

This association is in capability subclass VIIs, nonirrigated, and range site 26-10.

752—Pula-Chalco-Pung association. This association is on slopes and terraces of mountains. Slope is 15 to 50 percent. Elevation is 5,800 to 6,800 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Pula very stony loam, 30 to 50 percent slopes, 25 percent Chalco very stony loam, 30 to 50 percent slopes, and 20 percent Pung stony loam, 15 to 30 percent slopes. The Pula soil is on south-facing concave slopes, the Chalco soil is on north-facing convex slopes, and the Pung soil is on toe slopes.

Included with these soils in mapping are about 5 percent Holbrook soils on alluvial fans (range site: 26-10), 5 percent Verdico soils on terrace tops (range site; 26-23), 4 percent deep clayey Phing soils on terrace side slopes (range site: 26-25), and 1 percent outcrops of Tertiary mudstone on terrace side slopes. The included soils and outcrops of rock make up about 15 percent of mapped areas.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 4 inches thick. The subsoil is yellowish brown extremely gravelly clay about 20 inches thick. The

substratum to a depth of 60 inches or more is very pale brown extremely gravelly sandy loam.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface is covered with 15 to 25 percent stones. The surface layer is grayish brown very stony loam about 4 inches thick. The subsoil is pale brown clay about 12 inches thick. Tertiary mudstone is at a depth of 16 inches.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Pung soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 6 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam.

Permeability of the Pung soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pula soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity of the surface layer and steep slopes. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The potential plant community on the Chalco soil is mainly Wyoming big sagebrush, antelope bitterbrush, Indian ricegrass, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately high average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes, very low available water capacity, and a thin surface layer over a clay subsoil.

The potential plant community on the Pung soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by moderate average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are moderately steep slopes and a thin surface layer over a clay subsoil. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Seeding large areas of the Pung soil is difficult. This is because of the pattern in which this soil occurs with the Pula and Chalco soils. Slope limits access and movement by livestock on the Pula and Chalco soils and results in overgrazing of the less sloping areas of the Pung soil. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Chalco and Pung soils to produce plants suitable for grazing. Because of the very low available water capacity on the Pula and Chalco soils and the competition from the sagebrush and trees for moisture, desirable grasses are very slow to recover even if management is good.

Areas of this association are limited for roads because of moderately steep and steep slopes and by the presence of highly expandable clay with low strength in the Chalco and Pung soils. Roads need to be designed to provide a stable base and an adequate wearing surface to improve trafficability. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pula soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Chalco soil is in capability subclass VIIe, nonirrigated, and range site 26-29. The Pung soil is in capability subclass VIIs, nonirrigated, and range site 26-23.

753—Pula-Nosrac-Pung association. This association is on slopes and terraces of mountains. Slope is 15 to 50 percent. Elevation is 6,000 to 7,700 feet. The average annual precipitation is about 12 inches, the average annual temperature is 49 degrees F., and the average frost-free period is about 95 days.

This association is 40 percent Pula very stony loam, 30 to 50 percent slopes, 25 percent Nosrac stony fine

sandy loam, 30 to 50 percent slopes, and 20 percent Pung stony loam, 15 to 30 percent slopes. The Pula soil is on south- and west-facing side slopes, the Nosrac soil is on north- and east-facing side slopes, and the Pung soil is on toe slopes and broad ridges.

Included with these soils in mapping are about 7 percent Shree soils on alluvial fans (range site: 26-10), 6 percent Phing Variant soils on old terrace remnants (range site: 26-42), 1 percent Brockliss Variant soils on drainageways near springs (range site: 26-3), and 1 percent Brockliss Variant soils, drained, along drainageways (range site: 26-30). The included soils make up about 15 percent of mapped areas.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 5 inches thick. The subsoil is yellowish brown and about 25 inches thick. It averages extremely gravelly clay. The substratum to a depth of 60 inches or more is very pale brown extremely gravelly sandy loam.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is dark grayish brown stony fine sandy loam about 9 inches thick. The upper 31 inches of the subsoil is brown very gravelly clay loam, and the lower 20 inches is very pale brown very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Pung soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 8 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam.

Permeability of the Pung soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pula soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity of the surface layer.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, mountain brome, and western needlegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Pung soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are a thin surface layer over a clay subsoil and moderately steep slopes.

Seeding large areas of the Pung soil is difficult. This is because of the pattern in which the Pung soil occurs with the Pula and Nosrac soils. Because of the density of pinyon and juniper in some areas, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult. Steepness of slope limits access and movement of livestock on the Pula and Nosrac soils. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Pung soil. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Pung soil to produce vegetation suitable for grazing. Because of the very low available water capacity of the Pula soil and competition from the sagebrush and trees for moisture, desirable grasses are very slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of moderately steep and steep slopes and the presence of highly expandable clay that has low strength in the Pung soil. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide adequate surface drainage.

The Pula soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Pung soil is in capability subclass VIIs, nonirrigated, and range site 26-23.

762—Pulcan-Puett-Uhaldi association. This association is on side slopes of dissected, high terraces. Slope is 15 to 50 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 45 percent Pulcan very gravelly fine sandy loam, 15 to 30 percent slopes, 25 percent Puett gravelly fine sandy loam, 30 to 50 percent slopes, and 15 percent Uhaldi stony loam, 30 to 50 percent slopes. The Pulcan soil is on south- and west-facing side slopes, the Puett soil is on eroded parts of the south-facing side slopes, and the Uhaldi soil is on concave, north-facing side slopes.

Included with these soils in mapping are about 5 percent Indian Creek soils on toe slopes of terrace side slopes and low terraces (range site: 26-5), 5 percent Chalco soils on terrace tops (range site: 26-25), 3 percent Haybourne soils on alluvial fans (range site: 26-16), and 2 percent outcrops of Tertiary mudstone on steep side slopes. The included soils and outcrops of rock make up about 15 percent of mapped areas.

The Pulcan soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is brown and pale brown very gravelly fine sandy loam about 5 inches thick. The subsoil is brown very gravelly clay loam and very gravelly sandy clay about 20 inches thick. The substratum to a depth of 34 inches is pale brown very gravelly sandy loam. Tertiary mudstone is at a depth of 34 inches. In some small areas severe rill and sheet erosion has removed more than 75 percent of the original topsoil.

Permeability of the Pulcan soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 28 to 40 inches. Runoff is moderate, and the hazards of water erosion and soil blowing are slight.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is gravelly fine sandy loam about 3 inches thick. The underlying material to a depth of 16 inches is pale brown fine sandy loam. Tertiary mudstone is at a depth of 16 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 4 inches thick. The subsoil is brown gravelly clay loam about 21 inches thick. Tertiary mudstone is at a depth of 25 inches.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pulcan soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very low available water capacity.

The potential plant community on the Puett soil is mainly Wyoming big sagebrush, desert needlegrass, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, desert needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Because of the density of pinyon and juniper in most areas, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The steepness of slope limits access and movement of livestock on the Puett and Uhaldi soils. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Pulcan soil. Because of the low and very low available water capacities and the competition from sagebrush and trees for moisture, desirable grasses are very slow to recover even if grazing management is

good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Puett soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of moderately steep and steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pulcan soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29. The Uhaldi soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

771—Rawe gravelly sandy loam, 4 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,200 to 5,400 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 52 degrees F., and the average frost-free period is 120 days.

Typically, the surface layer is pale brown gravelly sandy loam about 5 inches thick. The subsoil is yellowish brown and about 18 inches thick. It averages gravelly clay. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Included with this soil in mapping are about 5 percent Perazzo soils on inset alluvial fans (range site: 27-18) and about 5 percent Veta soils on flood plains (range site: 26-34). The included soils make up about 10 percent of mapped areas.

Permeability of the Rawe soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is low average annual precipitation.

Livestock grazing should be managed to protect this soil from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the low average annual precipitation, moderate available water capacity, and competition from the greasewood and shadscale plants for moisture, desirable grasses are very slow to recover even if grazing management is good.

Areas of this soil are moderately limited for roads because of strong slopes. Roads should be located in the less sloping areas if possible to avoid excessive cutting and filling. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-18.

772—Rawe gravelly fine sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,200 to 5,400 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 52 degrees F., and the average frost-free period is about 120 days.

Typically, the surface layer is light gray and pale brown gravelly fine sandy loam about 3 inches thick. The subsoil is brown gravelly clay about 20 inches thick. The

substratum to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Included with this soil in mapping are 5 percent Perazzo soils on inset alluvial fans (range site: 27-18) and 5 percent Veta soils on recent flood plains (range site: 26-34). The included soils make up about 10 percent of mapped areas.

Permeability of this Rawe soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are a thin surface layer over a clayey subsoil and the low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Because of the low average annual precipitation, moderate available water capacity, and the competition from greasewood and shadscale for moisture, desirable grasses are very slow to recover even if grazing management is good.

Areas of this soil have few limitations for roads. Roads should be designed to provide adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-18.

781—Reno gravelly sandy loam, 2 to 8 percent slopes. This moderately deep, well drained soil is on terraces. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and igneous rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light gray gravelly sandy loam about 3 inches thick. The subsoil averages sandy clay. It is dark brown and 21 inches thick. The upper 8 inches of the substratum is light yellowish brown very gravelly coarse sand; the middle part is an indurated, silica-cemented hardpan; and the lower part to a depth of 60 inches is pale brown very gravelly loamy sand.

Included with this soil in mapping are about 2 percent alluvial fan scarps that are bare of vegetation and 5 percent Haybourne soils on inset alluvial fans (range site: 26-16). The included soils make up about 7 percent of the mapped areas.

Permeability of this Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides wth the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Because of the low available water capacity and the competition from sagebrush for moisture, desirable grasses are slow to recover even if management is good. Range seeding is needed if desirable plants are not available in amounts sufficient to protect the soil from erosion and provide a seed source. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are the moderately deep indurated hardpan, inadequate filtration

of septic tank effluent, and highly expandable clay. The hardpan is rippable with heavy equipment. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Because the lower part of the substratum is very rapidly permeable, special design is needed in some areas to avoid polluting nearby water supplies. The depth of footings should be below the highly expandable clayey subsoil.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-16.

782—Reno gravelly sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on pediments and alluvial fans. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and igneous rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown gravelly sandy loam about 6 inches thick. The subsoil is dark brown clay about 18 inches thick. The upper 10 inches of the substratum is an indurated, silica-cemented hardpan, and the lower part to a depth of 60 inches is light yellowish brown very gravelly loamy sand. In an area adjacent to the Carson City area, the surface layer is cobbly fine sandy loam, and slopes are 4 to 8 percent.

Included with this soil in mapping is about 5 percent Haybourne soils on inset alluvial fans (range site: 26-16).

Permeability of this Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing, wildlife habitat, and urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Because of the low available water capacity, moderately low average annual precipitation, and competition from big sagebrush for moisture, desirable grasses are very slow to recover even if management is good. Range seeding is needed if desirable plants are not available in amounts sufficient to protect the soil from erosion and provide a seed source. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are a moderately deep indurated hardpan, inadequate filtration of septic tank effluent, and highly expandable clay. The hardpan is rippable with heavy equipment. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Because the substratum is rapidly permeable, special design is needed in places to avoid polluting ground water. Footings should be placed below the highly expandable clayey subsoil.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads on this soil are difficult to maintain because of the clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-16.

783—Reno very cobbly loam, 2 to 8 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and igneous rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with about 10 to 25 percent cobbles. The surface layer is light brownish gray very cobbly loam about 2 inches thick. The subsoil is brown clay about 27 inches thick. The upper 10 inches of the substratum is an indurated, silica-cemented hardpan, and the lower part to a depth of 60 inches is very gravelly sand. In a few small areas the surface is very stony.

Included with this soil in mapping is about 5 percent Haybourne soils on inset alluvial fans (range site: 26-16).

Permeability of this Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. Some areas are used for urban development.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, bottlebrush squirreltail, and cheatgrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clayey subsoil.

Loss of the surface layer results in a severe decrease in productivity and in the potential of this soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the moderately low average annual precipitation and the competition from sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good.

The main limitations for urban development are the moderately deep indurated hardpan, slow permeability, and highly expandable clay. The hardpan is rippable with heavy equipment. If the septic tank absorption field is at a depth of 24 inches, slow permeability is a limitation. The suitability of this soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Because the lower part of the substratum is very rapidly permeable, special design is needed in some areas to avoid polluting nearby water supplies. The depth of footings should be below the highly expandable clayey subsoil.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because of the clay, which has low strength when wet. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

784—Reno gravelly clay loam, 0 to 4 percent slopes. This moderately deep, well drained soil is on old terraces and alluvial fans. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and various kinds of igneous rock. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray gravelly clay loam about 3 inches thick. The subsoil is dark brown clay about 19 inches thick. The upper 10 inches of the substratum is an indurated, silica-cemented hardpan about 10 inches thick, and the lower part to a depth of 60 inches is very pale brown very gravelly loamy sand.

Included with this soil in mapping is about 5 percent Haybourne soils on inset alluvial fans (range site 26-16).

Permeability of this Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing, wildlife habitat, and urban development.

The potential plant community on this soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clayey subsoil. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the moderately low average annual precipitation and the competition from sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good.

The main limitations for urban development are a moderately deep indurated hardpan, inadequate filtration of septic tank effluent, and highly expandable clay. The hardpan is rippable with heavy equipment. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Because the substratum is rapidly permeable, special design is needed in some areas to avoid polluting ground water. The depth of footings should be below the highly expandable clayey subsoil.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

785—Phing Variant-Reno association. This association is on alluvial fans and terraces. Slope is 2 to 15 percent. Elevation is 5,400 to 5,600 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 110 days.

This association is 65 percent Phing Variant extremely gravelly sandy loam, 2 to 8 percent slopes, and 20 percent Reno cobbly fine sandy loam, 4 to 15 percent slopes. The Phing Variant soil is on the lower slopes of the fans and terraces, and the Reno soil is on the upper slopes.

Included with these soils are about 10 percent Washoe soils on inset alluvial fans (range site: 26-16), 2 percent Veta soils on flood plains (range site: 26-34), and 3 percent Phing soils intermingled with the Phing Variant soils on terraces (range site: 26-25). The included soils make up about 15 percent of mapped areas.

The Phing Variant soil is moderately deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 60 to 70 percent pebbles. The surface layer is light gray and pale brown extremely gravelly sandy loam about 5 inches thick. The subsoil is dark brown and strong brown and is about 18 inches thick. It averages clay. The upper part of the substratum is pink loam about 4 inches thick, and the lower part to a depth of 36 inches or more is an indurated, silica-cemented hardpan.

Permeability of the Phing Variant soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Reno soil is moderately deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 5 to 10 percent cobbles. The surface layer is light brownish gray cobbly fine sandy loam about 4 inches thick. The subsoil is dark brown clay about 17 inches thick. Next is light yellowish brown very gravelly coarse sand about 7 inches thick, and below this is a very pale brown, indurated, silica-cemented hardpan about 7 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly loamy sand.

Permeability of this Reno soil is very slow above the hardpan. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Phing Variant soil is mainly black sagebrush, small rabbitbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly black sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity of the surface layer and extremely gravelly surface.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are a thin surface layer over a clay subsoil, very low available water capacity, and moderately low average annual precipitation.

Seeding large areas of the Reno soil is difficult. This is because of the pattern in which this soil occurs with the Phing Variant soil. Grazing should be delayed until the soils are firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing. Because of the moderately low average annual precipitation, low or very low available water capacity, and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be provided with adequate surface drainage.

The Phing Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-42. The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25.

786—Reno-Phing-Springmeyer association. This association is on terraces and alluvial fans. Slope is 2 to 15 percent. Elevation is 5,500 to 6,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Reno very cobbly loam, 2 to 8 percent slopes, 30 percent Phing very gravelly loam, 8 to 15 percent slopes, and 15 percent Springmeyer gravelly fine sandy loam, 4 to 15 percent slopes. The Reno soil is on terrace tops, the Phing soil is on terrace side slopes, and the Springmeyer soil is on alluvial fans at the base of terrace side slopes.

Included with these soils in mapping are about 5 percent Cassiro soils on steep, north-facing terrace slopes (range site: 26-10), 3 percent Haybourne soils on inset alluvial fans (range site: 26-16), 3 percent Puett soils on eroded side slopes (range site: 26-29), 2 percent Chalco soils on side slopes (range site: 26-29), and 2 percent very gravelly Shree soils on alluvial fans with the Springmeyer soils (range site: 26-10). The included soils make up about 15 percent of mapped areas.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and various kinds of igneous rock. Typically, the surface layer is covered with 10 to 20 percent cobbles. The surface layer is light brownish gray very cobbly loam about 2 inches thick. The subsoil is brown clay about 27 inches thick. Below this is an

indurated, silica-cemented hardpan about 12 inches thick. The substratum to a depth of 60 inches or more is very gravelly sand.

Permeability of the Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Phing soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is light brownish gray very gravelly loam about 6 inches thick. The subsoil is brown clay about 28 inches thick. The substratum to a depth of 60 inches or more is light brownish gray silty clay loam.

Permeability of this Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Springmeyer soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is brown gravelly fine sandy loam about 10 inches thick. The subsoil is brown gravelly sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is stratified, pale brown gravelly sandy clay loam to very gravelly loamy sand.

Permeability of the Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, bottlebrush squirreltail, and cheatgrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clayey subsoil.

The potential plant community on the Phing soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, bottlebrush squirreltail, and cheatgrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are a thin surface layer over a clay subsoil and moderately low average annual precipitation.

The potential plant community on the Springmeyer soil is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderate average annual precipitation and the gravelly surface layer.

Seeding large areas of the Springmeyer soil is difficult. This is because of the pattern in which this soil occurs with the Reno and Phing soils. The Springmeyer soil is in drainageways that receive additional moisture from nearby areas. The drainageways support the growth of annual grasses, forbs, and shrubs that provide additional grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils in this association from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Phing soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of the presence of highly expandable clay with low strength in the Reno and Phing soils. The strong slopes in the Phing and Springmeyer soils, frost heave in the Reno and Springmeyer soils, and highly expandable clay in the Springmeyer soil are moderate limitations. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be located in the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

The Reno and Phing soils are in capability subclass VIIs, nonirrigated, and range site 26-25. The Springmeyer soil is in capability subclass VIs, nonirrigated, and range site 26-10.

787—Reno-Saralegui association. This association is on alluvial fans. Slope is 2 to 8 percent. Elevation is 5,200 to 5,600 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Reno cobbly fine sandy loam, 4 to 8 percent slopes, and 35 percent Saralegui coarse sand, 2 to 8 percent slopes. The Reno soil is on older alluvial fans, and the Saralegui soil is on inset alluvial fans.

Included with these soils in mapping are about 5 percent Greenbrae soils on edges of alluvial fans (range site: 26-16), 5 percent very gravelly Washoe soils on the intermediate erosion surface above the Saralegui soils and below the Reno soils (range site: 26-16), and 5 percent very gravelly Holbrook soils on inset alluvial fans adjacent to the channels (range site: 26-10). The

included soils make up about 15 percent of mapped areas.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and various kinds of igneous rock. Typically, the surface is covered with 5 to 10 percent cobbles. The surface layer is light brownish gray and light gray cobbly fine sandy loam about 4 inches thick. The upper 28 inches of the subsoil is brown clay, and the lower 4 inches is yellowish brown sandy clay. Below this to a depth of 60 inches or more is an indurated, silica-cemented hardpan.

Permeability of the Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Saralegui soil is very deep and well drained. It formed in alluvium derived dominantly from granite but also from sedimentary and volcanic rocks. Typically, the surface layer is grayish brown and light brownish gray coarse sand about 7 inches thick. The subsoil is pale brown coarse sandy loam and sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown gravelly sandy loam.

Permeability of the Saralegui soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare flooding.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clay subsoil.

The potential plant community on the Saralegui soil is mainly Wyoming big sagebrush, Thurber needlegrass, Indian ricegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is moderately limited by low average annual precipitation and coarse surface texture. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity of the surface layer.

Because of low available water capacity in the Reno and Saralegui soils and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if management is good. Loss of the surface layer in the Reno soil results in a severe decrease in productivity and in the potential to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the presence of highly expandable clay in the Reno soil. Roads on the Reno soil are difficult to maintain because the clay has low strength when wet. Frost heaving and rare flooding are moderate limitations on the Saralegui soils. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Saralegui soil is in capability subclass VIIs, nonirrigated, and range site 26-16.

788—Reno-Stucky association. This association is on alluvial fans. Slope is 2 to 15 percent. Elevation is 5,200 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free season is about 110 days.

This association is 70 percent Reno cobbly fine sandy loam, 4 to 15 percent slopes, and 15 percent Stucky very cobbly loam, 2 to 8 percent slopes. The Reno soil is on the higher alluvial fans, and the Stucky soil is on inset alluvial fans.

Included with these soils in mapping are about 10 percent Holbrook soils on the upper part of alluvial fan drainageways (range site: 26-10) and 5 percent Haybourne soil on the lower part of alluvial fan drainageways (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and various kinds of igneous rock. Typically, the surface is covered with 5 to 10 percent cobbles. The surface layer is light brownish gray cobbly fine sandy loam about 4 inches thick. The subsoil is light brown clay and sandy clay about 28 inches thick. The next layer is a silica-cemented, indurated hardpan about 4 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly loamy sand.

Permeability of this Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Stucky soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is light brownish gray very cobbly loam about 5 inches thick. The subsoil is yellowish brown very cobbly sandy clay loam about 25

inches thick. Below this to a depth of 60 inches is stratified, yellowish brown and pale brown extremely cobbly sandy loam to very stony clay loam.

Permeability of the Stucky soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clayey subsoil.

The potential plant community on the Stucky soil is mainly low sagebrush, desert needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low available water capacity of the surface layer and low average annual precipitation.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Reno soil to produce plants suitable for grazing. Because of the low available water capacity, moderately low and low average annual precipitation, and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads on the Reno soil because of the presence of highly expandable clay and limited for roads on the Stucky soil because of the very cobbly surface. Roads on the Reno soil are difficult to maintain because the clay has low strength when wet. Unless an adequate wearing surface is maintained, the stones and cobbles on the Stucky soil are road hazards and result in increased maintenance cost. Roads should be designed to provide adequate surface drainage.

The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Stucky soil is in capability subclass VIIs, nonirrigated, and range site 26-47.

789—Phing Variant-Zephan association. This association is on terraces and low hills. Slope is 15 to 30 percent. Elevation is 5,200 to 5,600 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 65 percent Phing Variant extremely gravelly sandy loam, 15 to 30 percent slopes, and 20 percent Zephan stony sandy loam, 15 to 30 percent slopes. The Phing Variant soil is on terraces surrounding the low hills, and the Zephan soil is on low hills.

Included with these soils in mapping are about 5 percent Chalco soils on concave side slopes of hills (range site: 26-29), 9 percent Greenbrae soils on alluvial fans (range site: 26-16), and 1 percent Rock outcrop. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Phing Variant soil is moderately deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 55 to 65 percent pebbles. The surface layer is extremely gravelly sandy loam about 2 inches thick. The subsoil is strong brown clay about 25 inches thick. Below this to a depth of 36 inches is an indurated, silica-cemented hardpan.

Permeability of the Phing Variant soil is very slow. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 20 to 40 inches. Runoff is moderate, and the hazards of water erosion and soil blowing are slight.

The Zephan soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite and rhyolite. Typically, the surface is covered with about 2 percent stones. The surface layer is light brownish gray stony sandy loam about 5 inches thick. The subsoil is pale brown and yellowish brown very cobbly clay and very cobbly clay loam about 21 inches thick. Rhyolite bedrock is at a depth of 26 inches.

Permeability of the Zephan soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is moderate, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Phing Variant soil is mainly black sagebrush, small rabbitbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly black sagebrush and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the thin surface layer over a clay subsoil, the extremely gravelly surface, and very low available water capacity of the surface layer.

The potential plant community on the Zephan soil is mainly low sagebrush, Thurber needlegrass, bottlebrush

squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are a thin surface layer over a clayey subsoil and moderately low average precipitation.

Seeding large areas of the Zephan soil is difficult. This is because of the pattern in which the Zephan soil occurs with the Phing Variant soil. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing. Because of the moderately low average annual precipitation, low available water capacity, and competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the moderately steep slopes and highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be located in the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be provided with adequate surface drainage. Special design of roads is needed to overcome the limitation of slope.

The Phing Variant soil is in capability subclass VIIs, nonirrigated, and range site 26-42. The Zephan soil is in capability subclass VIs, nonirrigated, and range site 26-25.

791—Risue gravelly loam, 0 to 8 percent slopes. This shallow, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,200 to 5,400 feet. The average annual precipitation is 6 inches, the average annual temperature is about 52 degrees F., and the average frost-free period is about 120 days.

Typically, the surface layer is light brownish gray gravelly loam about 5 inches thick. The subsoil is brown clay about 13 inches thick. The substratum to a depth of 60 inches or more is an indurated, silica-cemented hardpan.

Included with this soil in mapping are about 5 percent Veta soils on inset alluvial fans (range site: 26-34), 2 percent Turria soils on young alluvial fans just below the Risue soil (range site: 26-31), and 5 percent clayey montmorillonitic, mesic Abruptic Durargids on fan remnants (range site: 27-18). The included soils make up about 12 percent of mapped areas.

Permeability of the Risue soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Bailey greasewood, shadscale, bottlebrush squirreltail, and Indian ricegrass. The present vegetation in most areas is mainly Bailey greasewood, shadscale, bud sagebrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low average annual precipitation and very low available water capacity. Because of the low average annual precipitation, very low available water capacity, and competition from the shrubs for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This Risue soil is limited for roads because of shallow depth to the hardpan and the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be designed to provide adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-18.

792—Risue very gravelly loam, 8 to 15 percent slopes. This shallow, well drained soil is on dissected, alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 5,200 to 5,400 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 52 degrees F., and the average frost-free period is about 120 days.

Typically, the surface layer is light brownish gray very gravelly loam about 3 inches thick. The subsoil is yellowish brown gravelly clay about 11 inches thick. The substratum to a depth of 60 inches or more is an indurated, silica-cemented hardpan. In some areas severe sheet and rill erosion has removed more than 75 percent of the original topsoil, and the subsoil has been exposed.

Included with this soil in mapping is about 5 percent Veta soils on inset alluvial fans (range site: 26-34).

The permeability of this Risue soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to the hardpan. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Bailey greasewood, shadscale, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Bailey greasewood, shadscale, bud sagebrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low average annual precipitation, the thin surface layer over a clayey subsoil, and very low available water capacity. Because of the very low available water capacity, low average annual precipitation, and competition from the shrubs for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of this soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This Risue soil is limited for roads because of shallow depth to the hardpan and the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads should be designed to provide surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-18.

801—Riverwash. This miscellaneous area consists of mixed, water-deposited sediment that generally is gravelly, cobbly, or stony. It is along waterways and drainage channels. Areas are flooded, and the material is washed and reworked by the Carson River during floods in winter, spring, and summer. Rock fragments generally range from about 1 inch to more than 10 inches in diameter. Areas are flooded so frequently that they support little or no vegetation.

This miscellaneous area is in capability subclass VIIIw, nonirrigated.

811—Rock outcrop. This miscellaneous area consists of barren, exposed bedrock. It is on slopes of mountains and hills and is moderately steep to very steep. Ninety percent or more of the surface is bedrock and less than 10 percent is soil material.

The Rock outcrop in the Carson Range is granitic or metamorphic. In the Pine Nut Mountains it is basaltic, granitic, or various sedimentary and metasedimentary rock. In areas where soil is mixed with Rock outcrop, sparse vegetation consisting of open stands of trees or shrubs similar to those of surrounding areas exists. Runoff is very rapid. The hazard of water erosion is slight because of the lack of soil material.

Areas are used for watershed and esthetic purposes.

This miscellanceous area is in capability subclass VIIIs, nonirrigated.

821—Roloc-Drit association. This association is on slopes of mountains. Slope is 50 to 75 percent. Elevation is 5,000 to 6,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 55 percent Roloc very gravelly sandy loam, 50 to 75 percent slopes, eroded, and 35 percent Drit stony sandy loam, 50 to 75 percent slopes. The Roloc soil is on south-facing convex slopes and ridges, and the Drit soil is on north-facing convex slopes.

Included with these soils in mapping are about 3 percent Rock outcrop on ridges and 7 percent Mottsville soils on toe slopes (range site: 26-26). The included soils and Rock outcrop make up about 10 percent of mapped areas.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown and dark grayish brown very gravelly sandy loam about 6 inches thick. The subsoil is grayish brown very gravelly coarse sandy loam about 9 inches thick. Weathered granite bedrock is at a depth of 15 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. The soil has been moderately eroded by sheet and rill erosion.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is dark grayish brown and dark brown stony sandy loam about 15 inches thick. Below this to a depth of 60 inches is brown very gravelly coarse sandy loam.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Roloc soil is mainly Wyoming big sagebrush, green ephedra, desert needlegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, green ephedra, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very steep slopes.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present

vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very steep slopes. Because of the density of pinyon and juniper in most areas of the Drit soil, the areas can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect these soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of very steep slopes. Special design for roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-11. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

831—Saralegui sand, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite but also from sedimentary and volcanic rocks. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown and grayish brown sand about 11 inches thick. The subsoil is grayish brown and brown gravelly sandy loam about 17 inches thick. The substratum to a depth of 60 inches or more is pale brown sand, loamy sand, and sandy loam.

Included with this soil in mapping is about 5 percent Haybourne soils on inset fans (range site: 26-16).

Permeability of this Saralegui soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Indian ricegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail. The production of vegetation is suitable for livestock grazing, but it is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity of the surface layer. Because of the very low available water capacity of the surface layer, moderately low average annual precipitation, and competition from the sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good. Livestock grazing should be managed to protect this soil from excessive soil blowing. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding, moderately rapid permeability, and unstable sidewalls in cutbanks. Structures that protect this soil from flash flooding are difficult to establish and maintain. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control soil blowing. Cutbanks are not stable and are subject to slumping. Community sewer systems are needed in areas of moderate to high density housing to prevent contamination of water supplies as a result of seepage.

Areas of this soil are moderately limited for roads because of rare flooding and moderate frost heaving. To establish and maintain structures to protect this soil from flash flooding is difficult. Local roads and streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage. During prolonged dry periods, roads are difficult to maintain because the presence of loose sand results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-16.

832—Saralegui sand, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite but also from sedimentary and volcanic rocks. Elevation is 4,800 to 4,900 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown and grayish brown sand about 11 inches thick. The subsoil is grayish brown and brown and is about 17 inches thick. It

averages gravelly sandy loam. The substratum to a depth of 60 inches or more is pale brown loamy sand and sand. In some areas the surface is stony.

Included with this soil in mapping is about 5 percent Haybourne soils on inset fans (range site: 26-16).

Permeability of this Saralegui soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Indian ricegrass, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sandy texture and very low available water capacity in the surface layer. Because of the moderately low average annual precipitation, very low available water capacity of the surface layer, and competition for moisture, desirable grasses are slow to recover even if grazing management is good. Livestock grazing should be managed to protect this soil from excessive soil blowing. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding, rapid permeability, and unstable sidewalls in cutbanks. Buildings should be located above the expected flood level. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control soil blowing. Cutbanks are not stable and are subject to slumping. Community sewer systems are needed in areas of moderate to high density housing to prevent contamination of water supplies as a result of seepage.

Areas of this soil are limited for roads because of rare flooding and moderate frost heaving. Structures that protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage. During prolonged dry periods, roads are difficult to maintain because the presence of loose sand results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-16.

833—Saralegui association. This association is on alluvial fan piedmonts. Slope is 2 to 8 percent. Elevation is 5,300 to 5,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Saralegui coarse sand, 2 to 8 percent slopes, and 25 percent Saralegui sandy loam, 2 to 4 percent slopes. The Saralegui coarse sand is on higher parts of alluvial fan piedmonts, and the Saralegui sandy loam is on inset alluvial fans.

Included with these soils in mapping are about 5 percent Washoe soils on edges of alluvial fan drainageways (range site: 26-16), 5 percent Indian Creek soils on terraces (range site: 26-25), and 5 percent Haybourne soils in filled channels on inset alluvial fans (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Saralegui coarse sand is very deep and well drained. It formed in alluvium derived dominantly from granitic rock but also from sedimentary and volcanic rocks. Typically, the surface layer is pale brown coarse sand about 6 inches thick. The subsoil is pale brown coarse sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown sandy loam.

Permeability of the Saralegui coarse sand is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The soil is subject to rare flooding.

The Saralegui sandy loam is very deep and well drained. It formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is light gray sandy loam about 3 inches thick. The subsoil is brownish gray sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Permeability of the Saralegui sandy loam is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Saralegui coarse sand is mainly Wyoming big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and Thurber needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, squirreltail, and Indian ricegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the

sandy texture and very low available water capacity of the surface layer.

The potential plant community on the Saralegui sandy loam is mainly Wyoming big sagebrush, Anderson peachbrush, bottlebrush squirreltail, and Indian ricegrass. The present vegetation is mainly Wyoming big sagebrush and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation.

Because of the low available water capacity and the competition from shrubs for moisture, desirable grasses are slow to recover even if management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the unit from excessive soil blowing.

Areas of this association are moderately limited for roads because of rare flooding and frost heaving. Structures that protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. During prolonged dry periods, roads are difficult to maintain on the Saralegui coarse sand because the presence of loose sand results in poor traction and an increased risk of soil blowing.

The Saralegui coarse sand is in capability subclass VIIs, nonirrigated, and range site 26-10. The Saralegui sandy loam is in capability subclass VIIs, nonirrigated, and range site 26-16.

834—Saralegui-Haybourne-Reno association. This association is on alluvial fans and terraces. Slope is 0 to 8 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Saralegui gravelly sandy loam, 2 to 8 percent slopes, 25 percent Haybourne gravelly sandy loam, 0 to 2 percent slopes, and 20 percent Reno stony loam, 2 to 4 percent slopes. The Saralegui soil is on the middle part of alluvial fan piedmonts, the Haybourne soil is on the skirt of alluvial fans, and the Reno soil is on old fan remnants.

Included with these soils in mapping are about 3 percent Veta soils along drainageways (range site: 26-34), 2 percent Phing soils on fan remnants, and 10 percent gravelly Washoe soils on upper parts of alluvial fan piedmonts (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Saralegui soil is very deep and well drained. It formed in alluvium derived dominantly from granite but also from sedimentary and volcanic rocks. Typically, the surface layer is grayish brown and light brownish gray gravelly sandy loam about 6 inches thick. The subsoil is yellowish brown gravelly sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is grayish brown gravelly sandy loam.

Permeability of the Saralegui soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

The Haybourne soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown and light brownish gray gravelly sandy loam about 12 inches thick. The subsoil is brown gravelly sandy loam about 10 inches thick. The substratum to a depth of 60 inches or more is yellowish brown, stratified gravelly sandy loam and fine sandy loam. A few small areas are gently sloping to strongly sloping.

Permeability of the Haybourne soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

The Reno soil is moderately deep and well drained. It formed in alluvium derived from granite, gneiss, sandstone, and various kinds of igneous rock. Typically, the surface is covered with about 2 percent stones. The surface layer is pale brown stony loam about 3 inches thick. The subsoil is brown clay 32 inches thick. The upper part of the substratum is an indurated, silica-cemented hardpan about 8 inches thick, and the lower part to a depth of 60 inches is pale brown very gravelly sand.

Permeability of this Reno soil is very slow. Available water capacity is moderate. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Saralegui soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low average annual precipitation and low available water capacity of the surface layer.

The potential plant community on the Haybourne soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and bottlebrush

squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low annual precipitation and low available water capacity of the surface layer.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are a thin surface layer over a clay subsoil.

Seeding large areas of the Saralegui and Haybourne soils is difficult. This is because of the size of the areas and the pattern in which the Saralegui and Haybourne soils occur with the Reno soil. Because of the moderately low average annual precipitation, moderate available water capacity, and competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Reno soil to produce plants suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of highly expandable clay with low strength in the Reno soil. Frost heaving and rare flooding in the Saralegui and Haybourne soils are moderate limitations. Structures to protect the soils from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

The Saralegui soil is in capability subclass VIIs, nonirrigated, and range site 26-16. The Haybourne soil is in capability subclass VIs, nonirrigated, and range site 26-16. The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25.

841—Searles-Devada-Duco association. This association is on the back slopes and ridges of mountains. Slope is 15 to 50 percent. Elevation is 6,800 to 7,700 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Searles very stony loam, 30 to 50 percent slopes, 25 percent Devada very cobbly loam, 15 to 50 percent slopes, and 15 percent Duco very cobbly fine sandy loam, 30 to 50 percent slopes. The Searles soil is on west-facing side slopes of mountains. The Devada soil is on ridges and shoulders, and the Duco soil is on south-facing side slopes of mountains.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and spurs, 5 percent Rubble land on side slopes of mountains, and 5 percent Pung soils on toe slopes and alluvial fans (range site: 26-23). The included soils, Rock outcrop, and Rubble land make up about 15 percent of mapped areas.

The Searles soil is moderately deep and well drained. It formed in colluvium derived dominantly from rhyolite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 14 inches thick. The subsoil is yellowish brown very gravelly clay loam about 17 inches thick. Rhyolite bedrock is at a depth of 31 inches.

Permeability of the Searles soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Devada soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, the surface layer is grayish brown very cobbly loam about 4 inches thick. The subsoil is brown gravelly clay about 10 inches thick. Rhyolite bedrock is at a depth of 14 inches.

Permeability of the Devada soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 10 to 25 percent cobbles. The surface layer is grayish brown very cobbly fine sandy loam about 6 inches thick. The subsoil is grayish brown very gravelly clay loam about 12 inches thick. Andesite bedrock is at a depth of 18 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The Searles soil is suited to the production of pinyon and juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity, high hazard of erosion, very stony surface, and steep slopes.

The Duco soil is suited to the production of pinyon and juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting of

trees are the steep slopes, the very cobbly surface, and very low available water capacity.

Plant competition delays natural revegetation but does not prevent the eventual development of a fully stocked, normal stand of trees. Stones and cobbles on the surface and steep slopes can interfere with the use of equipment. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Minimizing the risk of erosion is essential in harvesting trees.

The potential plant community on the Devada soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Devada soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the very stony or very cobbly surface and moderately steep and steep slopes. The Devada and Duco soils have bedrock at a shallow depth. Because of the underlying bedrock deep cuts should be avoided, especially on the Devada and Duco soils. The Devada soil has a clayey layer that has low strength. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage. Stones and cobbles on the surface make the construction of roads difficult.

The Searles soil is in capability subclass VIIs, nonirrigated. The Devada soil is in capability subclass VIIe, nonirrigated, and range site 26-23. The Duco soil is in capability subclass VIIe, nonirrigated.

842—Searles-Burnborough-Duco association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 7,200 to 7,800 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 90 days.

This association is 40 percent Searles very stony loam, 30 to 50 percent slopes, 30 percent Burnborough very stony loam, 30 to 50 percent slopes, and 15 percent Duco extremely stony loam, 15 to 30 percent slopes. The Searles soil is on concave south- and west-facing slopes, the Burnborough soil is on north- and east-facing slopes, and the Duco soil is on ridges and convex south-facing slopes.

Included with these soils in mapping are about 5 percent Kram soils adjacent to outcrops of limestone on hills (woodland site: Pinyon-juniper woodland), 5 percent Shree soils on alluvial fans (range site: 26-10), 3 percent Rock outcrop on ridges, and 2 percent Rubble land on side slopes. The included soils, Rock outcrop, and Rubble land make up about 15 percent of the mapped areas.

The Searles soil is moderately deep and well drained. It formed in colluvium derived dominantly from rhyolite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 6 inches thick. The subsoil is yellowish brown very gravelly clay loam about 30 inches thick. Rhyolite bedrock is at a depth of 36 inches.

Permeability of the Searles soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 9 inches thick. The subsoil to a depth of 60 inches or more is brown and pale brown very gravelly clay loam and very gravelly loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is brown extremely stony loam about 4 inches thick. The subsoil is brown very gravelly clay loam about 14 inches thick. Andesite bedrock is at a depth of 18 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing, woodland, and wildlife habitat.

The Searles soil is suited to the production of pinyon and juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the steep slopes, high hazard of erosion, very stony surface, and very low available water capacity.

The Duco soil is suited to the production of pinyon and juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1

foot. The main concerns in producing and harvesting trees are the very low available water capacity, shallow depth to bedrock, moderately steep slopes, and extremely stony surface.

Because the Searles soil is sticky when wet, most harvesting equipment should be used only durng dry periods. Minimizing the risk of erosion is essential in harvesting trees. Surface stones and moderately steep or steep slopes make harvesting of trees difficult. The very low available water capacity of the Duco soil generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity. The suitability of soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes. Steepness of slope also limits access and movement of livestock. Livestock grazing should be managed to protect this soil from excessive erosion and to prevent overgrazing in the less sloping areas. Cold soil temperatures limit plant growth. Grazing should be delayed until the soil has warmed up and the more desirable forage plants have achieved sufficient growth. Because of the density of pinyon and juniper in most areas, the Burnborough soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of the moderately steep and steep slopes and because of the shallow depth to bedrock and extremely stony surface of the Duco soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance cost. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Searles soil is in capability subclass VIIs, nonirrigated. The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Duco soil is in capability subclass VIIe, nonirrigated.

843—Searles-Burnborough-Chen association. This association is on slopes of mountains. Slope is 15 to 75 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 85 days.

This association is 40 percent Searles very stony loam, 30 to 50 percent slopes, 30 percent Burnborough very stony loam, 50 to 75 percent slopes, and 15 percent Chen very cobbly loam, 15 to 30 percent slopes. The Searles soil is on convex south-facing side slopes, the Burnborough soil is on north-facing side slopes, and the Chen soil is on ridges.

Included with these soils in mapping are about 1 percent Rock outcrop, mostly on ridges, 4 percent very gravelly loamy Pernty soils on ridges (range site: 26-5), 5 percent Softscrabble soils on concave south slopes (range site: 26-5), and 5 percent Sup soils on north-facing concave slopes near ridges (range site: 26-9). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Searles soil is moderately deep and well drained. It formed in colluvium derived dominantly from rhyolite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 6 inches thick. The subsoil is yellowish brown very gravelly clay loam about 21 inches thick. Rhyolite bedrock is at a depth of 27 inches.

Permeability of the Searles soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown and dark brown very stony loam about 14 inches thick. The subsoil to a depth of 60 inches or more is pale brown and light gray very gravelly clay loam and very gravelly loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Chen soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 25 percent cobbles. The surface layer is grayish brown very cobbly loam about 7 inches thick. The subsoil is brown very gravelly clay about 11 inches thick. Andesite bedrock is at a depth of 18 inches.

Permeability of the Chen soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing, woodland, and wildlife habitat.

The Searles soil is suited to the production of pinyon and juniper. It can produce 6 cords per acre in a stand

of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very stony surface, high hazard of erosion, steep slopes, and very low available water capacity. Minimizing the risk of erosion is essential in harvesting trees. Maintaining the understory vegetation is essential for the control of erosion. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Conventional methods of harvesting trees are difficult because of steep slopes. Because the soil is sticky when wet, most harvesting equipment should be used only during dry periods.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very steep slopes. Because of the density of trees, this soil can be managed for woodland. Reestablishment of the rangeland plant community, however, is difficult.

The potential plant community on the Chen soil is mainly low sagebrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and Sandberg bluegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in areas of the less sloping Chen soil. Burnborough and Chen soils have cold soil temperatures that limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth.

Areas of this association are limited for roads because of moderately steep and very steep slopes and because of the shallow depth to bedrock in the Chen soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Chen soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

The Searles soil is in capability subclass VIIs, nonirrigated. The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Chen soil is in capability subclass VIIs, nonirrigated, and range site 26-28.

851—Settlemeyer clay loam. This very deep, poorly drained soil is on smooth to very gently concave flood plains adjacent to the Carson River. It formed in alluvium derived dominantly from granite, but also from other rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark gray clay loam about 15 inches thick. The upper 20 inches of the underlying material is mottled, gray silty clay loam, and the lower part to a depth of 60 inches is mottled, olive gray, stratified fine sandy loam and loam. In some areas a clay substratum is below a depth of 40 inches.

Included with this soil in mapping is about 5 percent areas of soils that are rarely flooded.

Permeability of this Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1 to 3 feet from December through May. Runoff is very slow, and the hazard of water erosion is slight. This soil is subject to occasional, brief flooding from December through March. It is slightly saline-alkali below the surface layer.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development.

This soil is suited to hay and pasture. The main limitation is the moderately deep water table. Wetness limits the choice of plants, limits the period of cutting or grazing, and increases the risk of winterkill. Adapted grasses and legumes grow well if adequate fertilizer is used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Irrigation water can be applied by the border and corrugation methods. Application of irrigation water should be regulated to prevent a rise in the present water table. Leveling helps to insure the uniform application of water. Use of nitrogen and phosphorous fertilizers promotes good growth of forage plants.

The main limitations for urban development are the moderately deep water table, occasional flooding, and moderately slow permeability. Septic tank absorption fields do not function properly because of wetness and the moderately slow permeability. Buildings should be located above the expected flood level. Because of the moderately deep seasonal high water table, drainage should be provided for buildings with basements or crawl spaces.

Areas of this soil are limited for roads because of the occasional flooding, low strength of the soil, and severe

frost heave. Structures to protect this soil from flooding are difficult to establish and maintain. In some areas local roads and streets require a special base because of low strength and the hazard of frost heave. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIw, irrigated.

852—Settlemeyer clay loam, drained. This very deep, poorly drained soil is on smooth and very gently concave flood plains. Drainage has been altered. This soil formed in alluvium derived dominantly from granite, but also from other rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is dark grayish brown clay loam about 15 inches thick. The upper 13 inches of the underlying material is olive gray silty clay loam; the next 7 inches is mottled, olive gray clay loam; and the lower part to a depth of 60 inches is mottled, olive gray, stratified fine sandy loam and loam. In some areas a clay substratum is below a depth of 40 inches.

Included with this soil in mapping is about 5 percent areas of soils that are rarely flooded.

Permeability of this Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 4 feet from December through March. Runoff is very slow, and the hazard of water erosion is slight. The soil is subject to occasional brief periods of flooding from December through March. The original water table has been lowered as a result of changes in stream channel location or channel entrenchment.

Most areas of this soil are used for irrigated hay and pasture and for wildlife habitat. A few areas are used for urban development.

This Settlemeyer soil is well suited to hay and pasture and is suitable for irrigated crops. Adapted grasses and legumes grow well if adequate nitrogen and phosphorous fertilizers are used. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Irrigation water can be applied by the border and furrow methods. Application of irrigation water should be regulated to prevent a rise in the present water table. Leveling helps to insure the uniform application of water.

The main limitations for urban development are a deep water table, occasional flooding, and moderately slow permeability. Because of the deep seasonal high water table, drainage should be provided for buildings with basements or crawl spaces. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and moderately slow permeability.

Areas of this soil are limited for roads because of low strength of the soil, occasional flooding, and severe frost heaving. Structures that protect this soil from flooding are difficult to establish and maintain. In some areas, local roads and streets require a special base because of the low strength and the need to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIw, irrigated.

854—Settlemeyer loam, drained. This very deep, poorly drained soil is on flood plains. Drainage has been altered. This soil formed in alluvium derived from granite and other rock. Slope is 0 to 2 percent. Elevation is about 5,600 feet. The average annual precipitation is about 9 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown loam about 12 inches thick. The upper 18 inches of the underlying material is brown clay loam, and the lower part to a depth of 60 inches is pale brown loam.

Included with this soil in mapping are about 5 percent Brockliss Variant soils on lower lying parts of the flood plain (range site: 26-3) and about 5 percent Shree soils on alluvial fans (range site: 26-10). The included soils make up about 10 percent of the mapped areas.

Permeability of this Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 4 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding from December through March. The original water table has been lowered as a result of changes in stream channel location or channel entrenchment.

Areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for irrigated crops if irrigation water is available.

The potential plant community on this soil is mainly basin big sagebrush, rubber rabbitbrush, basin wildrye, and Nevada bluegrass. The present vegetation in most areas is mainly basin big sagebrush, rubber rabbitbrush, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low annual precipitation. Periodic flooding increases the amount of moisture available for plant growth and thus increases the amount of forage produced. Range seeding is needed if desirable plants are not available in amounts sufficient to protect the soil from erosion and provide a seed source. If plant cover is disturbed, protection from flooding is needed to control gullying, streambank cutting, and sheet erosion. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of low strength of the soil, occasional flooding, and severe frost heaving. Structures that protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas because of low strength and the hazard of frost heave. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIw, nonirrigated. It is in range site 26-30.

861—Shakespeare gravelly loam, 8 to 30 percent slopes. This very deep, somewhat poorly drained soil is on mountain pediments. It formed in alluvium derived dominantly from metavolcanic rock. Elevation is 8,500 to 9,000 feet. The average annual precipitation is about 30 inches, the average annual temperature is about 40 degrees F., and the average frost-free period is 50 days.

Typically, the surface layer is brown gravelly loam about 6 inches thick. The subsoil is brown and pale brown very gravelly loam about 31 inches thick. The substratum to a depth of 60 inches or more is stratified, light gray and pale brown very gravelly loam and gravelly silt loam. In some areas the surface layer is stony.

Included with this soil in mapping adjacent to the Tahoe Basin area is about 5 percent steep areas of Shakespeare soils that have a stony surface.

Permeability of this Shakespeare soil is slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 3 to 5 feet from December through May. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for woodland and wildlife habitat.

This soil is well suited to the production of California red fir. Based on a site index of 41, the potential production per acre of merchantable timber is 10,550 cubic feet or 65,700 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are a moderate erosion hazard and a deep seasonal high water table. Conventional methods of harvesting trees can be used, but their use may be limited because of the depth of snow and the deep seasonal high water table from December through May. Reforestation after harvesting must be carefully managed to reduce competition from undesirable understory plants. Plant competition delays natural regeneration but does not prevent the eventual development of a fully-stocked, normal stand of trees. When timber is cut or the understory removed, the soil readily erodes. Conventional methods can be used for tree harvest, but skid roads cause accelerated erosion. Careful management is necessary to prevent erosion.

Areas of this soil are limited for roads because of the severe frost heaving and the moderately steep slopes. In some areas, local roads and streets require a special base to prevent frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIe, nonirrigated.

871—Shree very gravelly loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown very gravelly loam about 10 inches thick. The subsoil is brown very gravelly clay loam about 16 inches thick. The substratum to a depth of 60 inches or more is dark brown very gravelly fine sandy loam. In some areas along drainageways, the surface is very stony.

Included with this soil in mapping are about 5 percent Springmeyer soils on inset alluvial fans (range site: 26-10) and 5 percent Cassiro soils on terrace breaks (range site: 26-10). The included soils make up about 10 percent of mapped areas.

Permeability of this Shree soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Most areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the moderately high average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the low available water capacity of the very gravelly surface layer. Because of the low available water capacity and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are moderately limited for roads because of rare flooding and moderate frost heaving. Structures that protect this soil from flash flooding are difficult to establish and maintain. Local roads and

streets require a special base in some areas to avoid frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

872—Shree very stony loam, 4 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,700 to 5,800 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown and brown very stony loam about 8 inches thick. The subsoil is brown very gravelly clay loam about 28 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly fine sandy loam. In some areas the surface layer is very gravelly.

Included with this soil in mapping are about 5 percent Springmeyer soils on inset alluvial fans (range site: 26-10) and 5 percent Cassiro soils on side slopes of alluvial fans (range site: 26-10). The included soils make up about 10 percent of mapped areas.

Permeability of this Shree soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is a very stony surface. Because of the low available water capacity and the competition from the sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the most desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are moderately limited for roads because of strong slopes, moderate frost heaving, and rare flooding. Structures that protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base to avoid frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

873—Shree-Settlemeyer association. This association is on alluvial fans and flood plains. Slope is 0 to 8 percent. Elevation is 5,500 to 6,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 70 percent Shree very gravelly fine sandy loam, 2 to 8 percent slopes, and 20 percent Settlemeyer loam, drained. The Shree soil is on alluvial fans, and the Settlemeyer soil is on flood plains.

Included with these soils in mapping are about 5 percent Brockliss Variant soils near springs (range site: 26-3) and 5 percent Verdico soils on terrace remnants (range site: 26-23). The included soils make up about 10 percent of the total acreage.

The Shree soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown and brown very gravelly fine sandy loam about 7 inches thick. The subsoil is brown and yellowish brown extremely gravelly sandy clay loam about 19 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown extremely gravelly sandy loam.

Permeability of this Shree soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

The Settlemeyer soil is very deep and poorly drained. It formed in alluvium derived from granite and other rock. Drainage has been altered. Typically, the surface layer is grayish brown loam about 12 inches thick. The upper 26 inches of the underlying material is grayish brown clay loam, and the lower part to a depth of 60 inches is olive gray, stratified loam and clay loam that has common pale olive, pale yellow, and olive yellow mottles.

Permeability of the Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that has been lowered by channel entrenchment to a depth of 3 to 4 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional brief flooding in December through March.

Areas of this soil are used for livestock grazing and wildlife habitat. The Settlemeyer soil is suitable for irrigated crops if irrigation water is made available.

The potential plant community on the Shree soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush

squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the very low available water capacity of the very gravelly surface layer.

The potential plant community on the Settlemeyer soil is mainly basin big sagebrush, basin wildrye, and Nevada bluegrass. The present vegetation in most areas is mainly basin big sagebrush and basin wildrye. The production of vegetation suitable for livestock grazing is limited by lowering of the water table late in summer. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is the moderate average annual precipitation.

Grazing should be delayed in areas of this association until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Range seeding is feasible if adapted species and recommended seeding methods are used.

Areas of this association are limited for roads because of low strength, occasional flooding, and severe frost heave of the Settlemeyer soil. On the Shree soil rare flooding and frost heaving are moderate limitations. Structures that protect the soils from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage. The most severe limitations can be reduced by building roads in areas of the Shree soil. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Shree soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Settlemeyer soil is in capability subclass VIw, nonirrigated, and range site 26-30.

874—Shree-Pung association. This association is on alluvial fans and terraces. Slope is 4 to 15 percent. Elevation is 6,600 to 7,200 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Shree very stony loam, 4 to 15 percent slopes, and 40 percent Pung stony loam, 8 to 15 percent slopes. The Shree soil is on alluvial fans, and the Pung soil is on terrace tops.

Included with these soils in mapping are about 8 percent Springmeyer soils on toe slopes of alluvial fans (range site: 26-10) and 7 percent Searles soils on small low hills (woodland site: Pinyon juniper woodland). The included soils make up about 15 percent of mapped areas.

The Shree soil is very deep and well drained. It formed in alluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is stratified, very gravelly loam to very gravelly sandy loam.

Permeability of the Shree soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight. The soil is subject to rare flooding.

The Pung soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 6 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam. In some small areas the surface is very gravelly, and slope is 15 to 50 percent.

Permeability of the Pung soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Shree soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the very stony surface.

The potential plant community on the Pung soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail with invasion by pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is a thin surface layer over clay subsoil.

Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer of the Pung soil results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing. Because of the moderate average annual precipitation and the competition from shrubs and trees, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads because of highly expandable clay with low strength in the Pung soil. The Shree soil is moderately limited by rare

flooding, frost heave, and strong slopes. In some areas, local roads and streets require a special base because of the low strength and to avoid frost heave damage. Structures to protect the Shree soil from flooding are difficult to establish and maintain. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Shree soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Pung soil is in capability subclass VIIs, nonirrigated, and range site 26-23.

881—Springmeyer gravelly fine sandy loam, 4 to 15 percent slopes. This very deep, well drained soil is on terraces. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown gravelly fine sandy loam about 10 inches thick. The subsoil is pale brown and brown gravelly sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown gravelly sandy clay loam.

Included with this soil in mapping is about 5 percent Verdico soils (range site: 26-23).

Permeability of this Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat. Areas are suitable for irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitabilility of this soil for rangeland seeding is fair. The main limitation for seeding is the moderate average annual precipitation. Seeding is feasible on this soil if adapted species and recommended seeding methods are used. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soil from excessive erosion.

Areas of this soil are limited for roads because of moderate frost heaving, moderate content of highly expandable clay, and strong slopes. Local roads and streets require a special base in some areas to avoid frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIs, nonirrigated. It is in range site 26-10.

882—Springmeyer stony fine sandy loam, 15 to 50 percent slopes. This very deep, well drained soil is on steep terraces and terrace breaks. It formed in alluvium derived from mixed sources of rock. Elevation is about 5,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony fine sandy loam about 10 inches thick. The subsoil is brown gravelly sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified gravelly sandy clay loam to loamy sand.

Included with this soil in mapping is about 5 percent Shree soils on alluvial fans (range site: 26-10).

Permeability of this Springmeyer soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately high average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. The steepness of slope limits access and movement by livestock and results in overgrazing of the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect this soil from excessive erosion.

Areas of this soil are limited for roads because of moderately steep and steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIe, nonirrigated. It is in range site 26-10.

883—Springmeyer very stony fine sandy loam, 30 to 50 percent slopes. This very deep, well drained soil is on steep terraces and terrace breaks. It formed in alluvium derived from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony fine sandy loam about 10 inches thick. The subsoil is brown gravelly sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified gravelly sandy clay loam to loamy sand.

Included with this soil in mapping is about 5 percent Uhaldi soils on north-facing terrace breaks (range site: 26-5).

Permeability of this Springmeyer soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately high average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes. Slope limits access and movement by livestock and results in overgrazing of the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soil from excessive erosion.

Areas of this soil are limited for roads because of steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

884—Springmeyer gravelly loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed sources of rock. Elevation is 5,800 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown gravelly loam about 10 inches thick. The subsoil is brown gravelly sandy clay loam about 18 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly loam.

Included with this soil in mapping are about 3 percent very cobbly Deven soils on low hills (range site: 26-23), 2 percent Shree soils on inset alluvial fans (range site: 26-10), and 5 percent Cassiro soils on higher parts of alluvial fans (range site: 26-10). The included soils make up about 10 percent of mapped areas.

Permeability of this Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development. Areas are suitable for irrigated crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is moderate average annual precipitation. Seeding is feasible on this soil when adapted species and recommended seeding methods are used. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are moderately slow permeability and shrink-swell potential. Septic tank absorption fields do not function properly because of the moderately slow permeability. Properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage to buildings because of moderate shrinking and swelling.

Areas of this soil are limited for roads because of moderate frost heaving and moderate content of highly expandable clay. Local roads and streets require a special base in some areas to avoid maintenance problems resulting from expandable clay and frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIs, nonirrigated. It is in range site 26-10.

891—Stodick very stony fine sandy loam, 4 to 15 percent slopes. This shallow, well drained soil is on rounded foothills. It formed in mixed alluvium and residuum derived from soft sedimentary rock. Elevation is 4,800 to 5,200 feet. The average annual precipitation

is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is covered with 3 to 15 percent stones. The surface layer is pale brown very stony fine sandy loam about 3 inches thick. The upper 7 inches of the subsoil is very pale brown and averages very gravelly clay loam. The lower 8 inches of the subsoil is pale olive very gravelly loam. Weathered bedrock is at a depth of 18 inches.

Included with this soil in mapping are about 10 percent Puett soils on side slopes of terraces (range site: 26-29), 3 percent Rock outcrop on ridges, and 2 percent moderately deep Indiano soils on north- and east-facing slopes on hills (range site: 26-10). The included soils and Rock outcrop make up about 15 percent of mapped areas.

Permeability of this Stodick soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly low sagebrush, Sandberg bluegrass, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very low available water capacity. Because of the very low available water capacity and the competition for moisture from the sagebrush, desirable grasses are slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of this soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of the strong slopes, shallow depth to bedrock, and moderate frost heaving. Because of the underlying bedrock deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and adequate wearing surface.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-25.

892—Stodick-Indiano association. This association is on low rolling hills. Slope is 15 to 50 percent. Elevation is 5,000 to 5,300 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Stodick stony fine sandy loam, 15 to 30 percent slopes, and 25 percent Indiano stony fine sandy loam, 30 to 50 percent slopes. The Stodick soil is on south- and west-facing side slopes and ridges, and the Indiano soil is on north- and east-facing side slopes.

Included with these soils in mapping are about 5 percent Greenbrae soils on alluvial fans (range site: 26-16), 5 percent Haybourne soils on inset alluvial fans and flood plains (range site: 26-16), 3 percent Toll soils on toe slopes of alluvial fans (range site: 26-20), and 2 percent Chalco soils on side slopes of terraces (range site: 26-29). The included soils make up about 15 percent of mapped areas.

The Stodick soil is shallow and well drained. It formed in mixed alluvium and residuum derived from soft sedimentary rock. Typically, the surface is covered with about 2 percent stones. The surface layer is light brownish gray stony fine sandy loam about 2 inches thick. The subsoil is brown very gravelly clay loam about 14 inches thick. Weathered bedrock is at a depth of 16 inches.

Permeability of the Stodick soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Indiano soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony fine sandy loam about 10 inches thick. The subsoil is pale brown gravelly clay loam about 24 inches thick. Andesite bedrock is at a depth of 34 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Stodick soil is mainly low sagebrush, Sandberg bluegrass, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity.

The potential plant community on the Indiano soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present

vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by moderate average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Because of the moderately low to moderate average annual precipitation, very low or moderate available water capacity, and the competition from sagebrush for moisture, desirable grasses are slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Slope limits access and movement by livestock and results in overgrazing of the less sloping areas of Stodick soil. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of moderately steep and steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

The Stodick soil is in capability subclass VIIe, nonirrigated, and range site 26-25. The Indiano soil is in capability subclass VIIe, nonirrigated, and range site 26-10.

901—Surgem-Olac-Cagle association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 5,000 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 45 percent Surgem extremely stony sandy loam, 30 to 50 percent slopes, 25 percent Olac very stony loam, 30 to 50 percent slopes, and 15 percent Cagle very stony loam, 15 to 50 percent slopes. The Surgem soil is on upper parts of south- and east-facing slopes, the Olac soil is on lower parts of south- and east-facing slopes and ridges, and the Cagle soil is on north-facing slopes.

Included with these soils in mapping are about 8 percent Holbrook soils on alluvial fans and drainageways (range site: 26-10), 4 percent Rock outcrop on ridges, and 3 percent Rubble land on side slopes. The included soils, Rock outcrop, and Rubble land make up about 15 percent of mapped areas.

The Surgem soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with 35 to 45 percent stones. The surface layer is light brownish gray extremely stony sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 16 inches thick. Granite bedrock is at a depth of 24 inches.

Permeability of the Surgem soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 30 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Olac soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite and granitic rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 2 inches thick. The subsoil is brown and pale brown extremely gravelly clay loam about 8 inches thick. Hard bedrock is at a depth of 10 inches.

Permeability of the Olac soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 8 to 14 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Cagle soil is moderately deep and well drained. It formed in colluvium derived dominantly from andesite and rhyolite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 4 inches thick. The upper 24 inches of the subsoil is dark brown gravelly clay, and the lower 8 inches is yellowish brown very cobbly clay loam. Weathered bedrock is at a depth of 36 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for woodland, livestock grazing, and wildlife habitat.

The potential plant community on the Surgem soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity of the stony surface layer.

The potential plant community on the Olac soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity.

Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Surgem and Olac soils to produce vegetation suitable for grazing. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the Surgem and Olac soils from erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The Cagle soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The low available water capacity generally influences seedling survival in areas where understory plants are numerous. The steepness of slope limits the kinds of equipment that can be used in woodland management.

Areas of this association are limited for roads because of moderately steep and steep slopes, shallow depth to bedrock in the Olac soil, and highly expandable clay in the Cagle soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Olac soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Stones and cobbles on the surface make the construction of roads difficult.

The Surgem soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Olac soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Cagle soil is in capability subclass VIIs, nonirrigated.

911—Theon very gravelly loam, 8 to 15 percent slopes. This soil is on low hills. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 51 degrees F., and the average frost-free period is about 120 days.

This Theon soil is very shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface layer is light gray very gravelly loam about 2 inches thick. The subsoil is brown and pale brown very gravelly clay loam about 11 inches thick. Below this is about 5 inches of weathered andesite. Hard andesite bedrock is at a depth of 18 inches. In some areas adjacent to Lyon County, the surface layer is very gravelly sandy loam. In some areas slopes are 15 to 30 percent.

Included with this soil in mapping are about 4 percent Veta soils along drainageways (range site: 26-34), 5 percent Olac soils on slightly moist east-facing slopes (range site: 26-25), 3 percent Perazzo soils on old alluvial fan remnants (range site: 27-18), and 3 percent Rock outcrop on ridges. The included soils and Rock outcrop make up about 15 percent of mapped areas.

Permeability of this Theon soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to soft andesite. The depth is 8 to 14 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly shadscale, Bailey greasewood, Indian ricegrass, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the low average annual precipitation and very low available water capacity.

Because of the low average annual precipitation, low available water capacity, and the competition from shadscale and greasewood for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soil to produce plants suitable for grazing.

Areas of this soil are limited for roads because of shallow depth to bedrock. Because of the underlying bedrock, deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 27-19.

912—Theon very gravelly loam, 15 to 50 percent slopes. This soil is on hills, and the steeper slopes are mainly north-facing. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 6 inches, the average annual temperature is about 52 degrees F., and the average frost-free period is about 120 days.

The Theon soil is very shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface layer is light gray very gravelly loam about 2 inches thick. The subsoil is brown and pale brown very gravelly clay loam about 11 inches thick.

Below this is about 5 inches of weathered andesite. Hard andesite bedrock is at a depth of 18 inches.

Included with this soil in mapping are about 3 percent Rock outcrop on ridges, 10 percent Veta soils along drainageways (range site: 26-34), and 2 percent Loomer soils on toe slopes (range site: 26-25). The included soils and Rock outcrop make up about 15 percent of mapped areas.

Permeability of this Theon soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to soft andesite. The depth is 8 to 14 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly shadscale, Bailey greasewood, Indian ricegrass, and desert needlegrass. The present vegetation suitable for livestock grazing is limited by the low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are low average annual precipitation and very low available water capacity.

Because of the low annual precipitation, very low available water capacity, and the competition from shrubs for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soil from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of this soil to produce plants suitable for grazing.

Areas of this soil are limited for roads because of moderately steep and steep slopes and shallow depth to bedrock. Because of the underlying bedrock, deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This soil is in capability subclass VIIe, nonirrigated. It is in range site 27-19.

921—Nevador Variant fine sandy loam, 0 to 4 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from Tertiary mudstone. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown fine sandy loam about 8 inches thick. The upper 2 inches of the subsoil is brown gravelly clay loam, and the lower 12 inches is pale brown gravelly loam and gravelly sandy loam. Below this to a depth of 60 inches or more is an indurated, silica- and lime-cemented hardpan.

Included with this soil in mapping are about 4 percent very gravelly Holbrook soils on inset alluvial fans (range site: 26-10) and 4 percent fine loamy Springmeyer soils on inset alluvial fans (range site: 26-10). The included soils make up about 8 percent of mapped areas.

Permeability of the Nevador Variant soil is moderately slow above the hardpan. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 21 to 34 inches. Runoff is slow, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is low available water capacity.

Because of the low available water capacity and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitation for urban development is moderate depth to the hardpan. The presence of highly expandable clay is a moderate limitation. Onsite sewage disposal systems commonly fail because of the hardpan.

Areas of this soil are limited for roads because of moderate depth to the hardpan and moderate frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

This soil is in capability VIIs, nonirrigated. It is in range site 26-10.

922—Nevador Variant loam, 4 to 15 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived from Tertiary mudstone. Slopes are slightly convex. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown loam about 8 inches thick. The upper 14 inches of the subsoil is grayish brown gravelly clay loam, and the lower 4

inches is pale brown loam. Below this to a depth of 60 inches or more is an indurated, silica- and lime-cemented hardpan.

Included with this soil in mapping is about 5 percent Springmeyer soils on inset alluvial fans (range site: 26-10).

Permeability of this Nevador Variant soil is moderately slow above the hardpan. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 21 to 34 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of juniper and pinyon. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is low available water capacity.

Because of the low available water capacity and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of strong slopes, moderate depth to the hardpan, and moderate frost heaving. Roads should be provided with adequate surface drainage. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

923—Nevador Variant very gravelly loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from Tertiary mudstone. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown very gravelly loam about 4 inches thick. The subsoil is brown gravelly clay loam about 19 inches thick. Below this to a depth of 60 inches or more is an indurated, silica- and lime-cemented hardpan.

Included with this soil in mapping are about 5 percent Shree soils on toe slopes of alluvial fans (range site: 26-10) and 5 percent Springmeyer soils on inset alluvial fans (range site: 26-10). The included soils make up about 10 percent of mapped areas.

Permeability of the Nevador Variant soil is moderately slow above the hardpan. Available water capacity is low. Effective rooting depth coincides with depth to the hardpan. The depth is 21 to 34 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development.

The potential plant community on this soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the very gravelly surface and low available water capacity.

Because of the lack of a seed source and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitation for urban development is moderate depth to the hardpan. The content of highly expandable clay is a moderate limitation. Onsite sewage disposal systems commonly fail because of the hardpan.

Areas of this soil are limited for roads because of moderate depth to the hardpan and moderate frost heaving. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-10.

931—Temo-Rock outcrop complex, 30 to 50 percent slopes. This complex is on side slopes of mountains. Elevation is 6,500 to 9,500 feet. The average annual precipitation is about 40 inches, the average annual temperature is about 35 degrees F., and the average frost-free period is about 50 days.

This complex is 75 percent Temo stony loamy coarse sand, 30 to 50 percent slopes, and 15 percent Rock outcrop. The Temo soil is on side slopes, and Rock outcrop is on ridges and side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 5 percent Witefels soils on toe slopes (woodland site: Pine-fir woodland) and 5 percent deep, extremely stony Graylock soils on concave side slopes (woodland site: Pine-fir woodland). The included soils make up about 10 percent of mapped areas.

The Temo soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of duff and pine needles about 2 inches thick. The surface layer is grayish brown stony loamy coarse sand about 6 inches thick. The underlying material to a depth of 9 inches is light brownish gray gravelly coarse sand. Weathered granite bedrock is at a depth of 9 inches. In some areas the surface layer is very bouldery.

Permeability of the Temo soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 8 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Temo soil is suited to the production of California red fir. Based on a site index of 35, the potential production per acre of merchantable timber is 9,400 cubic feet or 55,100 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are surface stones, steep slopes, moderate hazard of erosion, and the very low available water capacity. Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting are difficult to use because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited during December through June. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Hand planting of nursery stock is generally necessary to establish or improve a stand.

Areas of this soil are limited for roads because of steep slopes. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIe, nonirrigated.

932—Temo-Rock outcrop complex, 50 to 70 percent slopes. This complex is on very steep slopes of mountains. Elevation is 7,500 to 9,000 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 40 degrees F., and the average frost-free period is about 50 days.

This complex is 70 percent Temo extremely stony loamy coarse sand, 50 to 70 percent slopes, and 10 percent Rock outcrop. The Temo soil is on side slopes, and Rock outcrop is on crests of ridges. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 10 percent Witefels soils on toe slopes (woodland site: Pine-fir woodland) and 10 percent deep, extremely stony Graylock soils on concave side slopes (woodland site: Pine-fir woodland). The included soils make up about 20 percent of mapped areas.

The Temo soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles about 1 inch thick. The surface layer is grayish brown extremely stony loamy coarse sand about 10 inches thick. The underlying material to a depth of 16 inches is gravelly coarse sand and gravelly loamy coarse sand. Weathered granite bedrock is at a depth of 16 inches.

Permeability of the Temo soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 8 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed barren bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Temo soil is suited to the production of California red fir. Based on a site index of 35, the potential production per acre of merchantable timber is 9,400 cubic feet or 55,100 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are an extremely stony surface, very steep slopes, moderate hazard of erosion, and very low available water capacity.

Stones on the surface can interfere with the use of equipment. Conventional methods of harvest are difficult to use because of the steepness of slope. Highlead or other cable logging methods can be used for harvesting trees. Use of these methods is limited during December through June. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Hand planting of nursery stock is generally necessary to establish or improve a stand.

Areas of this complex are limited for roads because of very steep slopes. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

This complex is in capability subclass VIIe, nonirrigated.

941—Toiyabe-Rock outcrop complex, 30 to 50 percent slopes. This complex is on steep slopes of mountains. Elevation is 5,500 to 7,500 feet. The average annual precipitation is about 20 inches, the average annual temperature is about 42 degrees F., and the average frost-free period is about 80 days.

This complex is 75 percent Toiyabe very stony loamy coarse sand, 30 to 50 percent slopes, and 15 percent Rock outcrop. In areas adjoining the Carson City area, the proportion of Rock outcrop is somewhat higher. The Toiyabe soil is on side slopes of mountains, and Rock outcrop is on ridges and spurs. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 5 percent moderately deep Corbett soils on concave slopes (woodland site: Pine woodland) and 5 percent very gravelly Typic Xerorthents on mountain drainageways (woodland site: Pine woodland). The included soils make up about 10 percent of mapped areas.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is dark gray very stony loamy coarse sand about 7 inches thick. The underlying material to a depth of 15 inches is light brownish gray gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 15 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, granitic rock and less than 10 percent soil material.

Areas of this complex are used for pine woodland and wildlife habitat.

The Toiyabe soil is suited to the production of Jeffrey pine. Based on a site index of 35, the potential production per acre of merchantable timber is 210 cubic feet or 350 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very stony surface, moderate hazard of erosion, very low available water capacity, and steep slopes.

Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting trees are difficult to use because of slope. The highlead logging method is more efficient than most other methods and is less damaging to the soil surface. Harvesting is limited during November through May. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

Areas of this complex are limited for roads because of the outcrop of rock and steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This complex is in capability subclass VIIe, nonirrigated.

942—Toiyabe-Rock outcrop complex, 50 to 75 percent slopes. This complex is on very steep slopes of mountains. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 20 inches, the average annual temperature is about 42 degrees F., and the average frost-free period is about 80 days.

This complex is 70 percent Toiyabe very stony loamy coarse sand, 50 to 75 percent slopes, and 20 percent Rock outcrop. In areas adjoining the Carson City area, the proportion of Rock outcrop is somewhat higher. The Toiyabe soil is on side slopes and ridges, and Rock outcrop is on ridges and spurs. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this complex in mapping are about 5 percent moderately deep Corbett soils on concave slopes (woodland site: Pine woodland) and 5 percent deep very stony Xeropsamments on concave slopes and draws (woodland site: Pine woodland). The included soils make up about 10 percent of mapped areas.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is dark gray very stony loamy coarse sand about 6 inches thick. The underlying material to a depth of 15 inches is light brownish gray loamy coarse sand. Weathered granitic bedrock is at a depth of 17 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren granitic bedrock and less than 10 percent soil material.

Areas of this complex are used for woodland and wildlife habitat.

The Toiyabe soil is suited to the production of Jeffrey pine. Based on a site index of 35, the potential production per acre of merchantable timber is 210 cubic feet or 350 broad feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very stony surface, moderate hazard of erosion, very low available water capacity, and very steep slopes.

Stones on the surface can interfere with the use of equipment. Conventional methods of harvesting are difficult to use because of slope. The highlead logging method is more efficient than most other methods and is less damaging to the soil surface. Harvesting is limited during November through May. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

Areas of this complex are limited for roads because of the very steep slopes and outcrops of rock. Special design for roads is needed to overcome the limitation of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be provided with adequate surface drainage.

This complex is in capability subclass VIIe, nonirrigated.

951—Toll sand, 0 to 4 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from granite but partly from mixed sources of rock. Elevation is 4,700 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray sand about 4 inches thick. The upper 50 inches of the underlying material is pale brown loamy sand, and the lower part to a depth of 60 inches is pale brown coarse sand. In some areas the surface layer is sandy loam.

Included with this soil in mapping is about 5 percent Incy soils on sand dunes (range site: 26-14). A few small areas of Toll soils adjacent to the Carson City area are strongly sloping.

Permeability of this Toll soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are moderate.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat. Areas are suitable for irrigated hay, pasture, and crops if irrigation water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Indian ricegrass, and needleandthread. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are a sand surface layer that has very low available water capacity and the moderate hazard of soil blowing. Livestock grazing should be managed to protect this soil from excessive soil blowing. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the very low available water capacity and the competition from shrubs for moisture, desirable grasses are very slow to recover even if grazing management is good.

The main limitations for urban development are inadequate filtration of septic tank effluvent and unstable sidewalls in cutbanks. Because the underlying material is rapidly permeable, special design is needed in some areas to avoid polluting ground water or nearby water supplies. Cutbanks are not stable and are subject to slumping.

Areas of this soil have slight limitations for roads. During prolonged dry periods, roads are difficult to maintain because of the presence of loose sand which results in poor traction and an increased risk of soil blowing.

This soil is in capability subclasss IVs, irrigated, and VIIs, nonirrigated. It is in range site 26-20.

952—Toll sand, 4 to 15 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from granite but partly from mixed sources of rock. Elevation is 4,700 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray sand about 4 inches thick. The upper 50 inches of the underlying material is pale brown loamy sand, and the lower part to a depth of 60 inches is pale brown coarse sand.

Included with this soil in mapping is about 5 percent Toll soils on dunes (range site: 26-14).

Permeability of this Toll soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

Areas of this soil are used for livestock grazing, urban development, and wildlife habitat.

The potential plant community on this soil is mainly Wyoming big sagebrush, Indian ricegrass, and needleandthread. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are a sand surface layer that has very low available water capacity and the moderate hazard of soil blowing.

Because of the very low available water capacity and competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect this soil from excessive soil blowing.

The main limitations for urban development are inadequate filtration of septic tank effluent and unstable sidewalls in cutbanks. Strong slopes in areas are a moderate limitation. Because the substratum is rapidly permeable, special design is needed in some areas to avoid polluting ground water or nearby water supplies. Cutbanks are not stable and are subject to slumping.

Areas of this soil are moderately limited for roads because of strong slopes. Access roads must be designed to provide adequate slope on cutbanks, and drains must be used to control surface runoff and keep soil loss to a minimum. During prolonged dry periods roads are difficult to maintain because of the presence of loose sand which results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-20.

953—Toll sand, clay substratum, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granite but partly from mixed sources of rock. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray sand about 4 inches thick. The upper 39 inches of the underlying material is pale brown loamy sand, and the lower part to a depth of 60 inches is pale brown clay.

Included with this soil in mapping is about 5 percent Toll soils that are on lower parts of alluvial fans and do not have a substratum (range site: 26-16).

Permeability of this Toll soil is rapid to a depth of 43 inches and slow below this depth. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

Most areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development. Areas are suitable for irrigated crops if water is made available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Indian ricegrass, and needleandthread. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and needleandthread. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are a sand surface layer that has very low available water capacity and the moderate hazard of soil blowing. Grazing should be delayed until the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soil from excessive soil blowing.

The main limitations for urban development are inadequate filtration of septic tank effluent in the upper part of the underlying material and slow permeability in the lower part and unstable sidewalls in cutbanks. Septic tank filter fields require special design to overcome the limitation of rapid permeability in the upper part of the soil and slow permeability of the soil in the lower part. Cutbanks are not stable and are subject to slumping.

Areas of this soil have slight limitations for local roads and streets. During prolonged dry periods, roads are difficult to maintain because of the presence of loose sand. The loose sand results in poor traction and an increased risk of soil blowing.

This soil is in capability subclass IVs, irrigated, and VIIs, nonirrigated. It is in range site 26-20.

961—Burnborough-Glean association. This association is on slopes of mountains. Slope is 15 to 50 percent. Elevation is 7,500 to 8,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 65 days.

This association is 55 percent Burnborough very stony loam, 30 to 50 percent slopes, and 30 percent Glean stony loam, 15 to 50 percent slopes. The Burnborough soil is on south-facing slopes, and the Glean soil is on north-facing slopes.

Included with these soils in mapping are about 10 percent Sup soils on north-facing concave slopes near the ridges (range site: 26-9) and 5 percent Genoa soils on ridges and south-facing convex slopes (range site: 26-28). The included soils make up about 15 percent of mapped areas.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from mixed sources of rock. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 14 inches thick. The subsoil is yellowish brown very gravelly clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is very gravelly loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from

granite. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 19 inches thick. The underlying material to a depth of 60 inches is brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the cold soil temperatures and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Glean soil is mainly mountain big sagebrush, western needlegrass, Columbia needlegrass, and basin wildrye. The present vegetation in most areas is mainly mountain big sagebrush, western needlegrass, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by moderate available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Mechanical treatment of the surface is not practical because of the stones and steep slopes. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion. Livestock tend to graze the ridgetops and valleys, leaving the slopes essentially ungrazed. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth.

Areas of this association are limited for roads because of moderately steep and steep slopes. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38.

962—Burnborough-Pernty-Glean association. This association is on side slopes and ridges of mountains. Slope is 30 to 75 percent. Elevation is 6,000 to 7,000 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 70 days.

This association is 40 percent Burnborough very stony loam, 50 to 75 percent slopes, 25 percent Pernty very stony loam, 50 to 75 percent slopes, and 20 percent Glean very stony loam, 30 to 50 percent slopes. The Burnborough soil is on north- and east-facing convex side slopes, the Pernty soil is on ridges and shoulders, and the Glean soil is on concave north- and east-facing slopes.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and spurs, 5 percent Rubble land on side slopes and toe slopes, and 5 percent very gravelly, clayey Chen soils on ridges with the Pernty soil (range site: 26-28). The included soils, Rock outcrop, and Rubble land make up about 15 percent of mapped areas.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock and andesite. The surface is covered with 3 to 15 percent stones. Typically, the surface layer is grayish brown and brown very stony loam about 10 inches thick. The subsoil to a depth of 60 inches or more is pale brown and brown very gravelly clay loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Pernty soil is shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock and andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 4 inches thick. The subsoil to a depth of 19 inches is light brown very cobbly clay loam and very gravelly clay loam. Hard andesite bedrock is at a depth of 19 inches.

Permeability of the Pernty soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from igneous and sedimentary rocks. The surface is covered with 3 to 15 percent stones. Typically, the surface layer is dark grayish brown very stony loam about 23 inches thick. The underlying material to a depth of 60 inches or more is dark grayish brown very gravelly loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and low soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very steep slopes.

The Pernty soil is suited to the production of singleleaf pinyon and Utah juniper. It can produce 6 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. Management that minimizes the risk of erosion is essential in harvesting trees. Stones on the surface and steepness can interfere with the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The low available water capacity generally influences seedling survival in areas where understory plants are numerous.

The potential plant community on the Glean soil is mainly mountain big sagebrush, western needlegrass, basin wildrye, and spike fescue. The present vegetation in most areas is mainly mountain big sagebrush, curlleaf mountainmahogany, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity and low soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep and very steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Because of the density of pinyon and juniper on the Burnborough soil, this soil can be managed for woodland. Reestablishment of the rangeland plant community in some areas of the Burnborough soil is difficult. Cold soil temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Because of moderate and low available water capacities and the competition from singleleaf pinyon and curlleaf mountainmahogany, desirable grasses are very slow to recover even if grazing management is good.

Areas of this association are limited for roads because of the steep and very steep slopes and shallow depth to bedrock on the Pernty soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Pernty soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Pernty soil is in capability subclass VIIs, nonirrigated. The Glean soil is in capability subclass VIIs, nonirrigated, and range site 26-38.

963—Burnborough-Sup-Chen association. This association is on side slopes and crests of mountains. Slope is 4 to 50 percent. Elevation is 7,200 to 8,000 feet. The average annual precipitation is about 16 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 70 days.

This association is 40 percent Burnborough very stony loam, 30 to 50 percent slopes, 30 percent Sup stony loam, 15 to 30 percent slopes, and 15 percent Chen extremely stony loam, 4 to 15 percent slopes. The Burnborough soil is on south-facing side slopes, the Sup soil is on concave north-facing side slopes, and the Chen soil is on crests.

Included with these soils in mapping are about 5 percent Rock outcrop on ridges and spurs and 10 percent Glean soils on toe slopes (range site: 26-38). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Burnborough soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is brown very stony loam about 10 inches thick. The subsoil to a depth of 60 inches or more is brown very gravelly clay loam.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Sup soil is very deep and well drained. It formed in colluvium derived dominantly from andesite. Typically, the surface layer is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 12 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, stratified very gravelly loam and extremely gravelly coarse sandy loam.

Permeability of the Sup soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chen soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 15 to 35 percent stones. The surface layer is grayish brown extremely stony loam about 5 inches thick. The subsoil is grayish brown very gravelly clay about 10 inches thick. Hard andesite bedrock is at a depth of 15 inches.

Permeability of the Chen soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 12 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Burnborough soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the moderate available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Sup soil is mainly curlleaf mountainmahogany, mountain big sagebrush, pine bluegrass, and basin wildrye. The present vegetation in most areas is mainly curlleaf mountainmahogany, mountain big sagebrush, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity in the surface layer.

The potential plant community on the Chen soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity and cold soil temperatures. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and extremely stony surface.

Cold temperatures limit plant growth. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and prevent overgrazing in the less sloping areas of Chen soil. Livestock grazing should be managed to protect the soils from excessive erosion. Because of the density of pinyon and juniper trees in some areas, the areas can be managed for woodland. In some areas, reestablishment of the rangeland plant community is difficult.

Areas of this association are limited for roads because of steep and moderately steep slopes on the Burnborough and Sup soils and shallow depth to bedrock on the Chen soil. Because of the underlying bedrock, deep cuts should be avoided, especially on the Chen soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Burnborough soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Sup soil is in capability subclass VIIs, nonirrigated, and range site 26-9. The Chen soil is in capability subclass VIIs, nonirrigated, and range site 26-28.

972—Trid-Drit association. This association is on slopes of mountains. Slope is 4 to 50 percent. Elevation is 6,000 to 6,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 90 days.

This association is 40 percent Trid sandy loam, 30 to 50 percent slopes, 30 percent Trid sand, 4 to 15 percent slopes, and 15 percent Drit coarse sandy loam, 30 to 50 percent slopes. The Trid sandy loam is on south-facing slopes, the Trid sand is on pediments, and the Drit soil is on north-facing slopes.

Included with these soils in mapping are about 5 percent Shree soils on foot slopes (range site: 26-10), 5 percent Duco soils on ridges adjacent to steep mountains (woodland site: Pinyon-juniper woodland), 3 percent very cobbly Deven soils that have a clayey subsoil and are on pediment tops (range site: 26-23), and 2 percent deep, very gravelly, clayey Cassiro soils on concave slopes (range site: 26-10). The included soils make up about 15 percent of mapped areas.

The Trid sandy loam is moderately deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown and dark grayish brown sandy loam about 5 inches thick. The upper 19 inches of the subsoil is brown very gravelly sandy clay loam, and the lower 8 inches is light yellowish brown very gravelly sandy loam. Weathered granite bedrock is at a depth of 32 inches.

Permeability of the Trid sandy loam soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Trid sand is moderately deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown sand about 8 inches thick. The upper 8 inches of the subsoil is grayish brown gravelly sandy loam, and the lower 15 inches is yellowish brown very gravelly sandy clay loam. Weathered granite bedrock is at a depth of 31 inches.

Permeability of the Trid sand is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock.

Typically, the surface layer is grayish brown and brown coarse sandy loam about 8 inches thick. Below this is about 7 inches of brown and grayish brown gravelly coarse sandy loam. The subsoil to a depth of 38 inches is brown very gravelly coarse sandy loam. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Trid sandy loam is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Trid sand is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the sand surface layer and very low available water capacity.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and soil blowing and to prevent overgrazing in the less sloping areas of Trid sand. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the

areas can be managed for woodland. In some areas, reestablishment of the rangeland plant community is difficult.

Areas of this association are limited for roads because of steep slopes. Frost heaving and depth to bedrock are moderate limitations on the Trid soils. During prolonged dry periods, roads on Trid sand are difficult to maintain because of the presence of loose sand which results in poor traction and an increased risk of soil blowing. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Trid sandy loam is in capability subclass VIIe, nonirrigated, and range site 26-46. The Trid sand is in capability subclass VIIe, nonirrigated, and range site 26-46. The Drit soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

973—Trid-Drit-Duco association. This associationn is on slopes and ridges of mountains. Slope is 8 to 75 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 47 degrees F., and the average frost-free period is about 90 days.

This association is 45 percent Trid very stony fine sandy loam, 30 to 50 percent slopes, 25 percent Drit extremely stony sandy loam, 50 to 75 percent slopes, and 15 percent Duco extremely stony loam, 8 to 15 percent slopes. The Trid soil is on south-facing slopes, the Drit soil is on north- and east-facing slopes, and the Duco soil is on ridges.

Included with these soils in mapping are about 8 percent Glean soil on snow pockets (range site: 26-38), 3 percent Rock outcrop, mainly on ridges, 2 percent Rubble land on steep slopes, and 2 percent Chen soils on ridge tops (range site: 26-28). The included soils, Rock outcrop, and Rubble land make up about 15 percent of mapped areas.

The Trid soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is covered with 3 to 15 percent stones. The surface layer is dark gray very stony fine sandy loam about 6 inches thick. The upper 14 inches of the subsoil is brown extremely gravelly sandy clay loam, and the lower 14 inches is yellowish brown very gravelly sandy loam. Weathered granite bedrock is at a depth of 34 inches.

Permeability of the Trid soil is moderately slow. Available water capacity is very low. Effective rooting

depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with 25 to 55 percent stones. The surface layer is brown extremely stony sandy loam about 15 inches thick. Below this to a depth of 60 inches is pale brown very gravelly coarse sandy loam. This Drit soil is colder than normal for the Drit series.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 25 to 35 percent stones. The surface layer is brown extremely stony loam about 4 inches thick. The subsoil is brown very gravelly sandy clay loam about 10 inches thick. Granite bedrock is at a depth of 14 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and woodland.

The potential plant community on the Trid soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very steep slopes and extremely stony surface layer with very low available water capacity.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Because of the density of pinyon and juniper in most areas, the soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

The Duco soil is suited to the production of pinyon and juniper. It can produce 4 cords per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot. The main concerns in producing and harvesting trees are the very low available water capacity, shallow depth to bedrock, moderately steep slopes, and extremely stony surface. The very low available water capacity of the Duco soil generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

Areas of this association are limited for roads because of steep and very steep slopes and because of shallow depth to bedrock in the Duco soil. Special design for roads is needed to overcome the limitation of slope. Because of the underlying bedrock, deep cuts should be avoided, especially on the Duco soil. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Trid soil is in capability subclass VIIs, nonirrigated, and range site 26-46. The Drit soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Duco soil is in capability subclass VIIe, nonirrigated.

974—Trid-Roloc-Drit association. This association is on slopes and ridges of mountains. Slope is 15 to 50 percent. Elevation is 6,000 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 90 days.

This association is 40 percent Trid very stony fine sandy loam, 30 to 50 percent slopes, 30 percent Roloc gravelly sandy loam, 15 to 50 percent slopes, and 15 percent Drit coarse sandy loam, 15 to 50 percent slopes. The Trid soil is on slightly concave south- and west-facing slopes, the Roloc soil is on ridges and convex south-facing slopes, and the Drit soil is on north-facing slopes.

Included with these soils in mapping are about 6 percent Duco soils on crests (woodland site: Pinyon and juniper woodland), 6 percent very cobbly Deven soils on ridges adjacent to outcrops of rock (range site: 26-23), 2 percent Rock outcrop, mostly on ridges, and 1 percent loamy-skeletal, mixed, mesic Typic Haploxerolls on

north-facing foot slopes (woodland site: Aspen woodland). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Trid soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is covered with 3 to 15 percent stones. The surface layer is dark grayish brown very stony fine sandy loam about 6 inches thick. The subsoil is brown and yellowish brown extremely gravelly clay loam about 28 inches thick. Weathered granitic bedrock is at a depth of 34 inches.

Permeability of the Trid soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is dark grayish brown and grayish brown gravelly sandy loam about 9 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 9 inches thick. Weathered granitic bedrock is at a depth of 18 inches. In some areas soil temperatures are cooler than normal for the Roloc series.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Drit soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 8 inches thick. Next is about 7 inches of brown gravelly coarse sandy loam. Below this is about 23 inches of brown and yellowish brown very gravelly coarse sandy loam. The substratum is light yellowish brown very gravelly coarse sandy loam to a depth of 60 inches or more.

Permeability of the Drit soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Trid soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity of the surface layer.

The potential plant community on the Roloc soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Drit soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes.

Because of the density of pinyon and juniper in most areas, the soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult. Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of the Roloc and Drit soils. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of moderately steep and steep slopes. Special design of roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Trid soil is in capability subclass VIIs, nonirrigated, and range site 26-46. The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-46. The Drit soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

975—Trid-Roloc-Glean association. This association is on slopes and crests of mountains. Slope is 15 to 50 percent. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 14 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 90 days.

This association is 45 percent Trid very stony loam, 30 to 50 percent slopes, 25 percent Roloc gravelly sandy loam, 15 to 50 percent slopes, and 15 percent Glean stony sandy loam, 15 to 50 percent slopes. The Trid soil is on slightly concave south- and west-facing slopes, the Roloc soil is on crests and convex slopes, and the Glean soil is on north-facing concave slopes.

Included with these soils in mapping are about 5 percent Genoa soils in cooler parts on ridges and crests (range site: 26-28), 5 percent Minneha soils on ridges and shoulders adjacent to outcrops of rock (woodland site: Pinyon-juniper woodland), 3 percent Holbrook soils on alluvial fans (range site: 26-10), and 2 percent Pernty soils that are shallow to hard bedrock and on ridges and shoulders (woodland site: Pinyon-juniper woodland). The included soils make up about 15 percent of mapped areas.

The Trid soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is covered with 3 to 13 percent stones. The surface layer is grayish brown very stony loam about 8 inches thick. The subsoil is pale brown extremely gravelly sandy clay loam about 18 inches thick. Weathered granite bedrock is at a depth of 26 inches.

Permeability of the Trid soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is grayish brown and brown gravelly sandy loam about 9 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 6 inches thick. Weathered granitic bedrock is at a depth of 15 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glean soil is deep and very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown and brown stony sandy loam about 6 inches thick. The upper 24 inches of the underlying material is grayish brown very gravelly sandy loam, and the lower part to a depth of 60 inches is pale brown very gravelly sandy loam.

Permeability of the Glean soil is moderately rapid. Available water capacity is low. Effective rooting depth coincides with the depth to bedrock. The depth is 40 to 70 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Trid soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity of the surface layer.

The potential plant community on the Roloc soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Glean soil is mainly mountain big sagebrush, western needlegrass, basin wildrye, and spike fescue. The present vegetation in most areas is mainly mountain big sagebrush, western needlegrass, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by the cold soil temperatures and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement by livestock and promotes overgrazing of the less sloping areas. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of steep slopes. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Special design for roads is needed to overcome the limitation of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

The Trid soil is in capability subclass VIIs, nonirrigated, and range site 26-46. The Roloc soil is in capability subclass VIIe, nonirrigated, and range site 26-46. The Glean soil is in capability subclass VIIe, nonirrigated, and range site 26-38.

976—Trid-Roloc-Mottsville association. This association is on slopes and ridges of mountains. Slope is 15 to 50 percent. Elevation is 5,000 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 95 days.

This association is 45 percent Trid stony sandy loam, 30 to 50 percent slopes, 25 percent Roloc extremely stony sandy loam, 15 to 50 percent slopes, eroded, and 15 percent Mottsville gravelly loamy coarse sand, 15 to 50 percent slopes. The Trid soil is on the upper part of south-facing slopes, the Roloc soil is on ridges and convex slopes, and the Mottsville soil is on south-facing toe slopes.

Included with these soils in mapping are about 8 percent Drit soils on north-facing slopes (range site: 26-5), 4 percent Duco soils on ridges adjacent to outcrops of rock (woodland site: Pinyon-juniper woodland), and 3 percent Rock outcrop on ridges and side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Trid soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is covered with about 2 percent stones. The surface layer is grayish brown stony sandy loam about 11 inches thick. The subsoil is pale brown extremely gravelly sandy clay loam about 19 inches thick. Granite bedrock is at a depth of 30 inches.

Permeability of the Trid soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with about 25 to 35 percent stones. The surface layer is grayish brown extremely stony sandy loam about 6 inches thick. The subsoil is brown very gravelly coarse sandy loam about 8 inches thick. Weathered granite bedrock is at a depth of 14 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. The soil has been moderately eroded by sheet and rill erosion.

The Mottsville soil is very deep and excessively drained. It formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is brown gravelly loamy coarse sand about 16 inches thick. The underlying material to a depth of 60 inches is yellowish brown loamy sand.

Permeability of the Mottsville soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Trid soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Thurber needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Roloc soil is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity.

The potential plant community on the Mottsville soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and desert needlegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and the very low available water capacity in the surface layer.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping parts of the Roloc and Mottsville soils. Because of the low and very low available water capacities and the competition from the brush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing. Because of the density of pinyon and juniper on the Trid soil, it can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of moderately steep and steep slopes. Special design for roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in

the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Trid soil is in capability subclass VIIs, nonirrigated, and range site 26-46. The Roloc soil is in capability subclass VIIs, nonirrigated, and range site 26-46. The Mottsville soil is in capability subclass VIIs, nonirrigated, and range site 26-26.

977—Trid-Roloc-Sup association. This association is on slopes of mountains. Slope is 30 to 50 percent. Elevation is 7,000 to 8,500 feet. The average annual precipitation is about 16 inches, the average annual temperature is about 46 degrees F., and the average frost-free period is about 90 days.

This association is 40 percent Trid very stony loam, 30 to 50 percent slopes, 25 percent Roloc extremely stony sandy loam, 30 to 50 percent slopes, and 20 percent Sup very stony sandy loam, 30 to 50 percent slopes. The Trid soil is on south- and west-facing slopes, the Roloc soil is on convex north- and east-facing slopes, and Sup soil is on north-facing concave slopes near the crests.

Included with these soils in mapping are about 5 percent loamy-skeletal, mixed, mesic Lithic Argixerolls on ridges near outcrops of rock (woodland site: Pinyon-juniper woodland), 4 percent Cassiro soils on the lower part of south-facing slopes (range site: 26-10), 3 percent Burnborough soils on the concave lower part of north-facing slopes (range site: 26-5), and 3 percent Rock outcrop on ridges and side slopes. The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Trid soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with about 10 to 15 percent stones. The surface layer is dark grayish brown very stony loam about 11 inches thick. The subsoil is pale brown very gravelly clay loam about 23 inches thick. Granite bedrock is at a depth of 34 inches.

Permeability of the Trid soil is moderately slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Roloc soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with about 25 to 35 percent stones. The surface layer is brown extremely stony sandy loam about 9 inches thick. The subsoil is brown very gravelly coarse sandy loam about 7 inches thick. Weathered granite bedrock is at a depth of 16 inches.

Permeability of the Roloc soil is moderate. Available water capacity is very low. Effective rooting depth coincides with the depth to weathered bedrock. The depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Sup soil is very deep and well drained. It formed in colluvium derived dominantly from granitic rock. Typically, the surface is covered with a mat of leaves and twigs about 2 inches thick. The surface layer is dark grayish brown very stony sandy loam about 12 inches thick. The underlying material to a depth of 60 inches is pale brown, stratified very gravelly to extremely gravelly coarse sandy loam.

Permeability of the Sup soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Trid and Roloc soils is mainly mountain big sagebrush, antelope bitterbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and pine bluegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes, very low available water capacity, and extremely stony surfaces.

The potential plant community on the Sup soil is mainly curlleaf mountainmahogany, mountain big sagebrush, pine bluegrass, and basin wildrye. The present vegetation in most areas is mainly curlleaf mountainmahogany, mountain big sagebrush, and pine bluegrass. The production of vegetation suitable for livestock grazing is limited by cold soil temperatures and low available water capacity. This soil is generally not an important site for livestock grazing, because of the density of the mountainmahogany. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Roloc soil to produce vegetation suitable for grazing. Cold soil temperatures limit plant growth on the Sup soil. Grazing therefore should be delayed until the soil has warmed up and the plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas of Trid and Roloc soils, these soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes. Special design for roads is needed to

overcome the limitation of slope. Trafficability can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

The Trid and Roloc soils are in capability subclass VIIs, nonirrigated, and range site 26-46. The Sup soil is in capability subclass VIIs, nonirrigated, and range site 26-9.

982—Turria loam. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray loam about 2 inches thick. The subsoil is brown clay loam about 10 inches thick. The substratum to a depth of 60 inches or more is pale brown loam. In a small area north of Minden, the surface layer is clay loam.

Included with this soil in mapping is about 10 percent areas of soils that have a seasonal high water table between depths of 3 and 6 feet. These soils are adjacent to irrigated areas.

Permeability of this Turria soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing, irrigated crops, and wildlife habitat. Areas are suitable for urban development.

The potential plant community on this soil is mainly fourwing saltbush, big saltbush, basin wildrye, and western wheatgrass. The present vegetation in most areas is mainly fourwing saltbush, big saltbush, basin wildrye, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is moderately low average annual precipitation. Because of the lack of seed source and the competition from the saltbush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Range seeding can be applied when species adapted to the moderately low moisture supply are seeded.

This soil is well suited to irrigated crops. It is limited mainly by lack of irrigation water. Furrow, border, corrugation, and sprinkler irrigation methods are suited. The method used generally is governed by the crop. To avoid overirrigating and leaching of plant nutrients, applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs. Irrigation water must be applied carefully to prevent the development of a high water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitation for urban development is rare flooding. The moderately slow permeability is a limitation for septic tank absorption fields. Buildings should be located above the expected flood level. Septic tank absorption fields require special design to overcome the moderately slow permeability.

Areas of this soil are limited for roads because of low strength in the soil, rare flooding, and moderate frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas because of the low strength and the need to avoid frost heave damage.

This soil is in capability subclass IIc, irrigated, and VIc, nonirrigated. It is in range site 26-32.

985—Turria clay loam, wet. This very deep, well drained soil is on alluvial fans. Drainage has been altered. This soil formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray clay loam about 6 inches thick. The subsoil is brown clay loam and loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very fine sandy loam and silt loam. In some small areas north of Gardnerville, the surface layer is loam.

Included with this soil in mapping is about 5 percent Turria loam along the upper edge of the unit.

Permeability of the Turria soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. A high water table is at a depth of 4 to 6 feet during the irrigation season. The water table is the result of excess irrigation water on higher soils and the result of canal seepage. This soil is subject to rare flooding.

Areas of this soil are used for irrigated crops, livestock grazing, and wildlife habitat.

The potential plant community on this soil is mainly fourwing saltbush, big saltbush, basin wildrye, and western wheatgrass. The present vegetation in most areas is mainly fourwing saltbush, big saltbush, and basin wildrye. The production of vegetation suitable for livestock grazing is limited by the moderately low

average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Because of the lack of seed source and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Range seeding can be applied when species adapted to the moderately low moisture supply are seeded.

This soil is well suited to irrigated crops. It has few limitations. Most climatically adapted crops can be grown. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. The method used generally is governed by the crop. Irrigation water must be applied carefully to prevent a rise of the perched water table. Drainage may be required. Because of moderately slow permeability in this soil, irrigation water should be regulated so that it does not stand on the surface and damage crops. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond to nitrogen and phosphorous fertilizers. Tillage should be kept to a minimum.

Areas of this soil are limited for roads because of rare flooding, low strength of the soil, and moderate frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas because of low strength and to avoid frost heave damage.

This soil is in capability subclass IIw, irrigated, and VIw, nonirrigated. It is in range site 26-32.

986—Turria silty clay loam. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 4,950 feet to 5,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is grayish brown and light brownish gray silty clay loam and loam about 7 inches thick. The subsoil is light brownish gray clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is very pale brown, stratified very fine sandy loam and silt loam.

Included with this soil in mapping are about 3 percent Updike Variant soils on alluvial fan pediments (range site: 26-12) and 3 percent Updike soils on flood plains (range site: 26-21). The included soils make up about 6 percent of mapped areas.

Permeability of this Turria soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing and wildlife habitat. The soil is suited to irrigated hay, pasture, and crops if irrigation water is made available.

The potential plant community on this soil is mainly winterfat, fourwing saltbush, Indian ricegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly winterfat and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by moderately low average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the moderately low average annual precipitation. Because of the lack of seed source and the moderately low average annual precipitation, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Range seeding can be applied when species adapted to the moderately low moisture supply are seeded.

Areas of this soil are limited for roads because of rare flooding, low strength in the soil, and moderate frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas because of the low strength and to avoid frost heave damage.

This soil is in capability subclass IIc, irrigated, and VIc, nonirrigated. It is in range site 26-31.

992—Updike silty clay loam, moderately saline-alkali. This very deep, moderately well drained soil is on flood plains. It formed in alluvium derived dominantly from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 5,000 to 5,100 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray silty clay loam about 2 inches thick. The subsoil is brown clay about 39 inches thick. The substratum to a depth of 60 inches is light brownish gray loamy sand.

Included with this soil in mapping is about 10 percent Turria soils along the upper edge of the units.

Permeability of this Updike soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding. It is moderately saline-alkali in the surface layer and strongly saline-alkali below this depth. A seasonal high water table is at a depth between 5 and 6 feet in March through May.

Areas of this soil are used mainly for livestock grazing and wildlife habitat. They are also used for urban development.

The potential plant community on this soil is mainly black greasewood, basin big sagebrush, basin wildrye, and creeping wildrye. The present vegetation in most areas is mainly black greasewood, basin big sagebrush, and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the strongly saline-alkali subsoil and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the thin surface layer over a clay subsoil and the strongly saline-alkali subsoil.

Because of the strongly saline-alkali subsoil and the competition from greasewood and sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Cattle generally avoid areas of this soil unless their movement is restricted by fences. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding, highly expandable clay, unstable sidewalls in cutbanks, and very slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields require special design to overcome the limitation of the very slowly permeable subsoil. Special design of footings is needed to overcome the limitations of high shrink-swell potential and low strength. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of low strength and the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-12.

993—Updike-Springmeyer association. This association is on intermountain basins and alluvial fan piedmonts. Slope is 0 to 2 percent. Elevation is about 5,500 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Updike silty clay loam, occasionally flooded, and 35 percent Springmeyer silt loam, 0 to 2 percent slopes. The Updike soil is in basins, and the Springmeyer soil is on alluvial fans.

Included with these soils in mapping are about 5 percent Shree soils on inset alluvial fans (range site: 26-30) and 10 percent fine-loamy, mixed, mesic Xerollic Haplargids on alluvial fans surrounding basins (range site: 26-36). The included soils make up about 15 percent of mapped areas.

The Updike soil is very deep and moderately well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is light brownish gray silty clay loam about 2 inches thick. The subsoil is light brownish gray clay about 28 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy clay loam.

Permeability of the Updike soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches. The runoff is ponded, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, long periods of flooding from December through May. A seasonal high water table is between the depths of 5 and 6 feet from March through May.

The Springmeyer soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is grayish brown silt loam about 8 inches thick. The subsoil is light brownish gray sandy clay loam about 22 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified loam to gravelly clay loam.

Permeability of the Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Updike soil is mainly silver sagebrush, Baltic rush, mat muhly, and inland saltgrass. The present vegetation in most areas is mainly Baltic rush, mat muhly, inland saltgrass, and silver sagebrush. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation, occasional long duration of flooding, and a thin surface layer over a clay subsoil. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is a thin surface layer over a clay subsoil.

The potential plant community on the Springmeyer soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is the moderate average annual precipitation. Range seeding is feasible on this soil when species adapted to the annual precipitation are seeded.

Seeding large areas of the Springmeyer soil is difficult. This is because of the pattern in which this soil occurs with the Updike soil. Range seeding is needed if desirable plants are not available in amounts sufficient to protect the soils from erosion and provide a seed source. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of low strength of the soil, occasional flooding on the Updike soil, and highly expandable clay in the Updike

soil. Structures to protect the soils from flash flooding are difficult to establish and maintain. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be provided with adequate surface drainage.

The Updike soil is in capability subclass VIIw, nonirrigated, and range site 26-36. The Springmeyer soil is in capability subclass VIc, nonirrigated, and range site 26-10.

994—Updike silty clay loam, strongly saline-alkali. This very deep, moderately well drained soil is on flood plains. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is pale brown silty clay loam about 2 inches thick. The subsoil is brown clay about 39 inches thick. The substratum to a depth of 60 inches is brown loamy sand.

Included with this soil in mapping is about 10 percent Updike soils that are slightly saline-alkali.

Permeability of this Updike soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is strongly saline-alkali throughout. It is subject to rare flooding. A seasonal high water table is between the depths of 5 and 6 feet in March through May.

Areas of this soil are used for livestock grazing, wildlife habitat, and urban development.

The potential plant community on this soil is mainly black greasewood, basin wildrye, and inland saltgrass. The present vegetation in most areas is mainly black greasewood and inland saltgrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and a strongly saline-alkali root zone. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the strongly saline-alkali condition and a thin surface layer over a clay subsoil. Because of the thin surface layer, strongly saline-alkali condition, and the competition from greasewood and sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding, highly expandable clay, unstable sidewalls in cutbanks, and very slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields require special design to overcome the limitation of the very slowly permeable subsoil. Special design of footings is needed to overcome the limitation of high shrink-swell potential. Cutbanks are not stable and are subject to slumping.

Areas of this soil are limited for roads because of the presence of highly expandable clay. Roads are difficult to maintain because the clay has low strength when wet. Roads can be designed to offset the effects of shrinking and swelling and low strength. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-21.

1011—Verdico-Puett association. This association is on tops and side slopes of terraces. Slope is 4 to 50 percent. Elevation is 5,500 to 6,000 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the frost-free period is about 100 days.

This association is 60 percent Verdico very gravelly loam, 4 to 8 percent slopes, and 25 percent Puett gravelly sandy loam, 15 to 50 percent slopes. The Verdico soil is on terrace tops, and the Puett soil is on side slopes.

Included with these soils in mapping are about 10 percent outcrops of Tertiary mudstone on side slopes of terraces, 2 percent outcrops of granitic rock on slopes of hills, and 3 percent Glenbrook soils on slopes of hills (range site: 26-18). The included soils and outcrops make up about 15 percent of mapped areas.

The Verdico soil is moderately deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray very gravelly loam about 3 inches thick. The subsoil is pale brown clay about 27 inches thick. Tertiary mudstone is at a depth of 30 inches.

Permeability of the Verdico soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Puett soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface layer is pale brown gravelly sandy loam about 2 inches thick. The underlying material to a depth of 16 inches is light brownish gray, stratified loamy fine sand and fine sandy loam. Tertiary mudstone is at a depth of 18 inches.

Permeability of the Puett soil is moderately rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to the mudstone. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Verdico soil is mainly low sagebrush, Thurber needlegrass, pine bluegrass, and bottlebrush squirreltail. The present

vegetation is mainly low sagebrush and bottlebrush squirreltail.The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clay subsoil.

The potential plant community on the Puett soil is mainly Wyoming big sagebrush, antelope bitterbrush, desert needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, purple sage, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity and steep slopes.

Because of the very low and low available water capacities and the competition for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope on the Puett soil limits access by livestock and results in overgrazing of the less sloping areas of Verdico soils. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing. Livestock grazing should be managed to protect the soils from excessive erosion.

Areas of this association are limited for roads because of the highly expandable clay with low strength on the Verdico soil and the moderately steep or steep slopes on the Puett soil. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

The Verdico soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Puett soil is in capability subclass VIIe, nonirrigated, and range site 26-29.

1012—Verdico-Uhaldi-Springmeyer association. This association is on tops and side slopes of terraces and on alluvial fans. Slope is 2 to 30 percent. Elevation is 6,500 to 7,000 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 95 days.

This association is 40 percent Verdico gravelly loam, 4 to 8 percent slopes, 30 percent Uhaldi very stony loam, 15 to 30 percent slopes, and 15 percent Springmeyer gravelly loam, 2 to 8 percent slopes. The Verdico soil is on tops of terraces, the Uhaldi soil is on north-facing side slopes of terraces, and the Springmeyer soil is on alluvial fans.

Included with these soils in mapping are about 5 percent Holbrook soils on inset alluvial fans (range site: 26-10), 5 percent Pung soils on old remnants of fans (range site: 26-23), and 5 percent Puett soils on terrace breaks (range site 26-29). The included soils make up about 15 percent of mapped areas.

The Verdico soil is moderately deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is light brownish gray and grayish brown gravelly loam about 4 inches thick. The subsoil is light brownish gray and pale brown clay about 31 inches thick. Tertiary mudstone is at a depth of 35 inches.

Permeability of the Verdico soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 3 to 15 percent stones. The surface layer is grayish brown very stony loam about 5 inches thick. The subsoil is dark grayish brown, brown, and pale brown gravelly clay loam about 19 inches thick. Tertiary mudstone is at a depth of 24 inches.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to mudstone. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Springmeyer soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface layer is brown gravelly loam about 10 inches thick. The subsoil is brown clay loam about 15 inches thick. The substratum to a depth of 60 inches is pale brown, stratified fine sandy loam to very gravelly loam.

Permeability of the Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Verdico soil is mainly low sagebrush, Thurber needlegrass, pine bluegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clay subsoil.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush,

western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity in the very stony surface layer.

The potential plant community on the Springmeyer soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is the moderate average annual precipitation. Range seeding on this soil is feasible when adapted species and recommended seeding methods are used.

Seeding large areas of the Springmeyer soil is difficult. This is because of the pattern in which this soil occurs with the Verdico and Uhaldi soils. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Verdico soil to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of the highly expandable clay with low strength in the Verdico soil and the moderately steep slopes on the Uhaldi soil. Frost heaving on the Uhaldi and Springmeyer soils is a moderate limitation. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Verdico soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Uhaldi soil is in capability subclass VIIs, nonirrigated, and range site 26-5. The Springmeyer soil is in capability subclass VIs, nonirrigated, and range site 26-10.

1021—Veta very gravelly sandy loam, rarely flooded, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources of rock. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 51 degrees F., and the average frost-free period is about 120 days.

Typically, the surface layer is brown very gravelly sandy loam about 3 inches thick. The subsoil is pale brown very gravelly sandy loam about 12 inches thick. The substratum to a depth of 60 inches is pale brown, stratified very gravelly sandy loam and extremely gravelly sandy loam.

Included with this soil in mapping is about 5 percent Holbrook soils near channels.

Permeability of this Veta soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding.

Areas of this soil are used for livestock grazing and wildlife habitat. Small areas are used for urban development.

The potential plant community on this soil is mainly basin big sagebrush, antelope bitterbrush, basin wildrye, and wheatgrass. The present vegetation in most areas is mainly basin big sagebrush, basin wildrye, and wheatgrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very low available water capacity. The areas in drainageways receive additional moisture from nearby soils. Following seasonal rains, the drainageways support vegetation that provides additional grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are rare flooding and unstable sidewalls in cutbanks. Buildings should be located above the expected flood level. Cutbanks are not stable and are subject to slumping.

Areas of this soil are moderately limited for roads because of rare flooding and frost heaving. Structures to protect this soil from flash flooding are difficult to establish and maintain. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-34.

1031—Vicee-Rock outcrop complex, 50 to 75 percent slopes. This association is on slopes of mountains. Elevation is 6,000 to 7,500 feet. The average annual precipitation is about 30 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 65 days.

This association is 65 percent Vicee gravelly very fine sandy loam, 50 to 75 percent slopes, and 20 percent Rock outcrop. The Vicee soil is on side slopes of mountains, and Rock outcrop is on ridges and spurs. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with this association in mapping are about 10 percent Franktown soils on ridges (woodland site: Pine woodland), 3 percent Gralic soils on concave north-facing slopes (woodland site: Pine-fir woodland), and 2 percent Rubble land. The included soils and Rubble land make up about 15 percent of mapped areas.

The Vicee soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rock. Typically, the surface is covered with a mat of pine needles about 2 inches thick. The surface layer is gray gravelly very fine sandy loam about 13 inches thick. The underlying material to a depth of 60 inches is light brownish gray gravelly very fine sandy loam.

Permeability of the Vicee soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed, barren metavolcanic bedrock and less than 10 percent soil material.

Areas of this association are used for woodland and wildlife habitat.

The Vicee soil is suited to the production of Jeffrey pine. Based on a site index of 89, the potential production per acre of merchantable timber is 4,800 cubic feet or 22,200 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very steep slopes, high hazard of erosion, and severe equipment limitations.

Steepness of slope limits the kinds of equipment that can be used in forest management. Conventional methods of harvesting trees are difficult because of slope. The highlead logging method is more efficient than most other methods and is less damaging to the soil surface. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Minimizing the risk of erosion is essential in harvesting trees.

Areas of this association are limited for roads because of the very steep slopes. Special design for roads is needed to overcome the limitations of slope. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance cost. Roads should be designed to provide surface drainage.

This association is in capability subclass VIIe, nonirrigated.

1041—Voltaire silty clay loam, wet, strongly saline-alkali. This very deep, poorly drained soil is on alluvial fans and flood plains. The drainage has been altered. This soil formed in alluvium derived from granite, rhyolite, andesite, basalt, gneiss, and slate. Slope is 0 to 2 percent. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 to 10 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray silty clay loam about 20 inches thick. Below this to a depth of 60 inches is mottled, olive gray and gray, stratified silty clay loam to loamy sand. In some areas the surface layer is sandy loam. In the northern part of the Carson Valley are areas that have a silty clay surface layer.

Included with this soil in mapping is about 5 percent soils that are rarely flooded.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table within a depth of 1.5 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to occasional, brief flooding from December through March. The surface layer is strongly saline-alkali affected, and the underlying material is slightly saline-alkali affected.

Areas of this soil are used for livestock grazing, irrigated hay and pasture, and wildlife habitat.

The potential plant community on this soil is mainly inland saltgrass and black greasewood. The present vegetation in most areas is mainly inland saltgrass and black greasewood. The production of vegetation suitable for livestock grazing is limited by the strong saline-alkali condition in the surface layer and lowering of the water table late in summer. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkali surface layer. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is poorly suited to hay and pasture. The main limitations are the strongly saline-alkali surface layer and the shallow seasonal high water table. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Soil amendments, such as gypsum, and careful irrigation water management can reduce the concentration of salts. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Application of irrigation water should be regulated to prevent a rise in the present water table. Annual applications of nitrogen fertilizer are needed to maintain production of high quality irrigated pasture.

Areas of this soil are limited for roads by severe frost heaving, occasional flooding, low strength of the soil, and a shallow seasonal high water table. Structures to protect this soil from flooding are difficult to establish and maintain. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Drainage or special design is needed to overcome the

limitation imposed by the high water table. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass VIw, irrigated, and VIIw, nonirrigated. It is in range site 26-2.

1042—Voltaire silty clay. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from granite, rhyolite, andesite, basalt, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray silty clay about 20 inches thick. It has mottling in the lower part. The upper 9 inches of the underlying material is mottled, olive gray loam; the next 16 inches is gray silty clay loam, and the lower part to a depth of 60 inches is mottled, olive gray loam and fine sandy loam.

Included with this soil in mapping is about 10 percent areas of soils that are rarely flooded.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is slightly saline-alkali below the surface layer. It is subject to occasional, brief flooding in December through March.

Areas of this soil are used for livestock grazing, irrigated hay and pasture, and wildlife habitat.

The potential plant community on the Voltaire soil is mainly inland saltgrass, black greasewood, and alkali seepweed. The present vegetation in most areas is mainly inland saltgrass and black greasewood. The production of vegetation is limited by the moderately low average annual precipitation and lowering of the water table late in summer. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is the silty clay surface texture. Shallow-rooted, water-tolerant plants are suited to this soil. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock. Periodic flooding increases the amount of soil moisture available for plant growth, and this increases the amount of forage produced.

This soil is suited to hay and pasture. The main limitations are a moderately deep seasonal high water table, slow infiltration, and slow permeability. Grazing when the soil is wet results in compaction of the surface layer and poor infiltration. Therefore grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Wetness limits the choice of plants and the period of cutting or grazing and increases the risk of winterkill. Grasses and legumes grow well if adequate fertilizer is used. Nitrogen and phosphorous fertilizers promote good growth of forage plants. Border irrigation is suited to this soil. Excessive water on the surface can be removed by surface drains. Application of irrigation water should be regulated to prevent a rise in the present water table. Leveling helps to insure the uniform application of water.

Areas of this soil are limited for roads because of low strength of the soil, occasional periods of flooding, and severe frost heaving. Roads are difficult to maintain because of clay, which has low strength when wet. Local roads and streets require a special base in some areas to avoid frost heave damage. Structures to protect this soil from flash flooding are difficult to establish and maintain.

This soil is in capability subclass IVw, irrigated, and VIIw, nonirrigated. It is in range site 26-2.

1044—Voltaire clay, slightly saline-alkali. This very deep, poorly drained soil is on low lying flood plains. It formed in alluvium derived from granite, rhyolite, andesite, basalt, gneiss, and slate. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is gray clay about 20 inches thick. It has mottling in the lower part. The underlying material to a depth of 60 inches is stratified, mottled, olive gray and gray silty clay loam and very fine sandy loam.

Included with this soil in mapping is about 7 percent Voltaire soils that are strongly saline-alkali.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3 feet from December through May. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is slightly saline-alkali affected in the surface layer but is less affected below the surface layer. It is subject to occasional, brief flooding in December through March.

Most areas of this soil are used for livestock grazing, irrigated hay and pasture, and wildlife habitat. A few areas are used for urban development.

The potential plant community on the Voltaire soil is mainly black greasewood, big saltbush, alkali sacaton, and inland saltgrass. The present vegetation in most areas is mainly black greasewood and inland saltgrass. The production of vegetation is limited by the slightly saline-alkali surface layer, moderately low average annual precipitation, and lowering of the water table late in summer. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the slightly saline-alkali surface layer. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is suited to hay and pasture. The main limitations are a moderately deep seasonal high water table, slow infiltration, and slow permeability. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Soil amendments, such as gypsum, along with drainage and irrigation water management can reduce the concentration of salts. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and poor infiltration. Nitrogen fertilizer promotes good growth of forage plants. Border and corrugation irrigation methods are suited to this soil. Because of the slow permeability of this soil, the time and rate of application of irrigation water should be adjusted to permit adequate infiltration. Leveling helps to insure the uniform application of water. Application of irrigation water should be regulated to prevent a rise in the water table. Excessive water on the surface can be removed by surface drains.

The main limitations for urban development are the moderately deep seasonal high water table, occasional flooding, and slow permeability. Buildings should be located above the expected flood level. Septic tank absorption fields do not function properly because of wetness and slow permeability.

Areas of this soil are limited for roads because of low strength in the soil, occasional flooding, and frost heaving. Roads are difficult to maintain because of the presence of clay, which has low strength when wet. Flooding can be controlled by use of major flood control structures. Local roads and streets require a special base in some areas to avoid frost heave damage.

This soil is in capability subclass IVw, irrigated, and VIIw, nonirrigated. It is in range site 26-13.

1051—Voltaire Variant clay loam. This very deep, very poorly drained soil is on slightly concave flood plains. It formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent. Elevation is about 4,700 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is 100 to 120 days.

Typically, the surface layer is light gray clay loam about 6 inches thick. The upper 19 inches of the underlying material is light brownish gray silty clay, and the lower part to a depth of 60 inches is gray and very pale brown silt loam. Iron mottles are throughout the profile.

Included with this soil in mapping is about 5 percent Voltaire soils.

Permeability of this Voltaire Variant soil is slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table at a depth of 1 to 2 feet from February through August. Runoff is very slow, and the hazards of water erosion and soil blowing are slight. This soil is subject to rare flooding. It is strongly saline-alkali affected.

Areas of this soil are used for livestock grazing, irrigated hay and pasture, and wildlife habitat.

The potential plant community on this soil is mainly inland saltgrass, alkali seepweed, and black greasewood. The present vegetation in most areas is mainly inland saltgrass and alkali bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation, the strongly saline-alkali condition, and the lowering of the water table late in summer. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the strongly saline-alkali surface layer. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is poorly suited to hay and pasture. The main limitations are the shallow depth to a seasonal high water table, slow permeability, and a strongly saline-alkali surface layer. The concentration of salts and alkali in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Drainage and irrigation water management reduce the concentration of salts. Salt-tolerant species are more suitable for planting than most other species. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and low infiltration. Annual applications of nitrogen fertilizer are needed to maintain production of irrigated pasture.

Areas of this soil are limited for roads because of the presence of highly expandable clay and severe frost heaving. Roads are difficult to maintain because the clay has low strength when wet. Local roads and streets require a special base in some areas to improve strength and avoid frost heave damage.

This soil is in capability subclass VIw, irrigated, and VIIw, nonirrigated. It is in range site 26-2.

1061—Washoe gravelly sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on nearly level terraces. It formed in alluvium derived from mixed sources of rock. Elevation is 4,700 to 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown gravelly sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy clay loam about 31 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, stratified very gravelly loamy coarse sand and gravelly loamy coarse sand.

Included with this soil in mapping is about 5 percent Holbrook soils on inset alluvial fans (range site: 26-10).

Permeability of this Washoe soil is moderately slow. Available water capacity is moderate. Effective rooting

depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for irrigated crops and wildlife habitat. A few areas are used for urban development.

This soil is suited to irrigated crops. The main limitation is moderate available water capacity. Crops respond to nitrogen and phosphorous fertilizers. Irrigation water can be applied by the border, sprinkler, and corrugation methods. Leveling helps to insure the uniform application of water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are unstable sidewalls in cutbanks, moderately slow permeability, and inadequate filtration of septic tank effluent if deep lines are used. The highly expandable clay in the subsoil is a moderate limitation. Septic tank absorption fields do not function properly because of moderately slow permeability in the subsoil. Because the substratum is rapidly permeable, special design is needed in some areas to avoid pollution of the ground water or nearby water supplies. Special design of footings is needed because of the moderate shrink-swell potential.

Areas of this soil are limited for roads because of moderate frost heave and the moderately expandable clay in the subsoil. Local roads and streets require a special base in some areas to avoid maintenance problems resulting from the expandable clay and frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass IIIs, irrigated, and VIc, nonirrigated.

1062—Washoe very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on terraces. It formed in alluvium derived from mixed sources of rock. Elevation is about 5,200 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface is covered with 35 to 45 percent pebbles. The surface layer is light brownish gray very gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly sandy clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.

Included with this soil in mapping is about 5 percent Holbrook soils on inset alluvial fans (range site: 26-10).

Permeability of this Washoe soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat. A few areas are used for urban development. Areas are suitable for irrigated crops if irrigation water is available.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, and Indian ricegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low annual precipitation, very gravelly surface layer, and low available water capacity of the surface layer. Because of the moderately low average annual precipitation, low available water capacity of the surface layer, and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

The main limitations for urban development are inadequate filtration of septic tank effluent if lines are deep, moderately slow permeability in the subsoil, and unstable sidewalls in cutbanks. The highly expandable clay in the subsoil is a moderate limitation. Septic tank absorption fields do not function properly because of the moderately slow permeability. Because the substratum is rapidly permeable, special design is needed in some areas to avoid polluting ground water or nearby water supplies. Special design of footings is needed because of the moderate shrink-swell potential.

Areas of this soil are moderately limited for roads because of frost heave and the highly expandable clay in the subsoil. Local roads and streets require a special base in some areas to avoid maintenance problems caused by the expandable clay and frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs. It is in range site 26-16.

1063—Washoe cobbly sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on nearly level terraces. It formed in alluvium derived from mixed sources of rock. Elevation is about 4,800 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

Typically, the surface layer is brown cobbly sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy clay loam and very gravelly coarse sandy loam about 31 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly loamy coarse sand.

Included with this soil in mapping is about 10 percent loamy-skeletal, Aridic Haploxerolls on strongly sloping to steep terrace breaks and fault scarps (range site: 26-10).

Permeability of this Washoe soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazards of water erosion and soil blowing are slight.

Most areas of this soil are used for livestock grazing, urban development, and wildlife habitat. A few areas are used for irrigated crops.

The potential plant community on this soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Anderson peachbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the low available water capacity of the surface layer and the moderately low average annual precipitation. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

This soil is suited to irrigated crops. The main limitations are moderate available water capacity and the cobbly surface. Because the soil is droughty, light and frequent applications of irrigation water are needed. Crops respond to nitrogen and phosphorous fertilizers. The use of equipment is limited by cobbles on the surface. Furrow, border, corrugation, and sprinkler irrigation methods are suited to this soil. Leveling helps to insure the uniform application of water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

The main limitations for urban development are unstable sidewalls of cutbanks, moderately slow permeability, and inadequate filtration of septic tank effluent in the substratum. The highly expandable clay in the subsoil is a moderate limitation. Septic tank absorption fields do not function properly because of moderately slow permeability. Because the substratum is rapidly permeable, special design is needed in some areas to avoid pollution of ground water or nearby water supplies. Special design of footings is needed because of the moderate shrink-swell potential. Removal of cobbles in disturbed areas is required for best results when landscaping, particularly in areas used for lawns.

Areas of this soil are limited for roads because of frost heave and the moderate content of highly expandable clay in the subsoil. Local roads and streets require a special base in some areas to avoid maintenance problems resulting from the expandable clay and frost heave damage. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIs, nonirrigated, and IVs, nonirrigated. It is in range site 26-16.

1066—Washoe-Reno association. This association is on alluvial fans and terraces. Slope is 2 to 15 percent. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 50 percent Washoe stony loam, 2 to 8 percent slopes, and 35 percent Reno cobbly sandy loam, 4 to 15 percent slopes. The Washoe soil is on terraces, and the Reno soil is on alluvial fans and terraces.

Included with these soils in mapping are about 10 percent Haybourne soils, gravelly substratum, along drainageways (range site: 26-16) and 5 percent Haybourne soils on inset alluvial fans (range site: 26-16). The included soils make up about 15 percent of mapped areas.

The Washoe soil is very deep and well drained. It formed in alluvium derived from mixed sources of rock. Typically, the surface is covered with about 2 percent stones. The surface layer is light brownish gray stony loam about 7 inches thick. The subsoil is light yellowish brown very gravelly sandy clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.

Permeability of the Washoe soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from granite, gneiss, sandstone, and various kinds of igneous rock. Typically, the surface is covered with 5 to 10 percent cobbles. The surface layer is light brownish gray cobbly sandy loam about 4 inches thick. The subsoil is yellowish brown clay about 27 inches thick. Below this is an indurated hardpan about 13 inches thick. The substratum to a depth of 60 inches is pale brown very gravelly loamy sand.

Permeability of the Reno soil is very slow. Available water capacity is low. Effective rooting depth coincides with the depth to the hardpan. The depth is 20 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Washoe soil is mainly Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass, and Indian ricegrass. The present vegetation in most areas is mainly Wyoming big sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low

average annual precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are moderately low average annual precipitation and the low available water capacity of the surface layer.

The potential plant community on the Reno soil is mainly low sagebrush, Thurber needlegrass, Sandberg bluegrass, and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clay subsoil.

Seeding large areas of the Washoe soil is difficult. This is because of the pattern in which the Washoe soil occurs with the Reno soil. Because of the thin surface layer of the Reno soil and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Reno soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure

Areas of this association are limited for roads because of the presence of highly expandable clay with low strength. Strong slopes and moderate frost heave are limitations in the Washoe soil. Local roads and streets require a special base in some areas to avoid maintenance problems resulting from low strength, highly expandable clay, and frost heave damage. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Washoe soil is in capability subclass VIs, nonirrigated, and range site 26-16. The Reno soil is in capability subclass VIIs, nonirrigated, and range site 26-25.

1071—Corbett gravelly sand, 15 to 30 percent slopes. This moderately deep, somewhat excessively drained soil is on slopes on mountains. It formed in colluvium derived dominantly from granitic rock. Elevation is 5,500 to 7,500 feet. The average annual precipitation is about 35 inches, the average annual temperature is about 41 degrees F., and the average frost-free period is about 65 days.

Typically, the surface is covered with a mat of conifer needles and leaves about 2 inches thick. The surface layer is grayish brown gravelly sand about 3 inches thick. The underlying material to a depth of 24 inches is pale brown gravelly loamy sand. Soft granitic bedrock is at a depth of 24 inches.

Included with this soil in mapping are about 10 percent sandy-skeletal, mixed, frigid Entic Haploxerolls on concave slopes (woodland site: Pine woodland), 5 percent loamy Haploxeralfs adjacent to the Carson City area on pediments (woodland site: Pine woodland), and 5 percent Ophir soils on narrow bottom lands. The included soils make up about 20 percent of mapped areas.

Permeability of this Corbett soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 24 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for woodland and wildlife habitat. Burned-over areas can be used for livestock grazing.

This soil is suited to the production of Jeffrey pine. Based on a site index of 62, the potential production per acre of merchantable timber is 2,000 cubic feet or 7,800 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting timber are the very low available water capacity and moderately steep slopes. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. The steepness of slope limits the kinds of equipment that can be used in forest management. Conventional methods of harvest can be used.

Areas of this soil are limited for roads because of moderately steep slopes. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and to reduce maintenance costs. Roads should be designed to provide adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated.

1072—Corbett-Toiyabe complex, 30 to 50 percent slopes. This complex is on side slopes of mountains. Elevation is 6,000 to 7,000 feet. The average annual precipitation is about 30 inches, the average annual temperature is about 43 degrees F., and the average frost-free period is about 80 days.

This complex is 55 percent Corbett loamy coarse sand, 30 to 50 percent slopes, and 30 percent Toiyabe stony loamy coarse sand, 30 to 50 percent slopes. The Corbett soil is on north-facing side slopes, and the Toiyabe soil is on ridges and south-facing side slopes. The components of this complex are so intricately intermingled that to map them separately was not practical.

Included with these soils in mapping are about 5 percent granitic Rock outcrop on ridges and 10 percent mixed, frigid Dystric Xeropsamments on toe slopes

(woodland site: Pine woodland). The included soils and Rock outcrop make up about 15 percent of mapped areas.

The Corbett soil is moderately deep and somewhat excessively drained. It formed in residuum derived from granitic rock. Typically, the surface is covered with a mat of conifer needles about 2 inches thick. The surface layer is grayish brown loamy coarse sand about 3 inches thick. The underlying material to a depth of 24 inches is pale brown gravelly loamy coarse sand. Soft granitic bedrock is at a depth of 24 inches. In a few areas slopes are 8 to 30 percent.

Permeability of the Corbett soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 24 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived from granitic rock. Typically, the surface is covered with a mat of conifer needles about 2 inches thick. The surface layer is dark grayish brown stony loamy coarse sand about 7 inches thick. The underlying material to a depth of 15 inches is light brownish gray loamy coarse sand. Soft granitic bedrock is at a depth of 15 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this complex are used for woodland and wildlife habitat.

The Corbett soil is suited to the production of Jeffrey pine. Based on a site index of 62, the potential production per acre of merchantable timber is 2,000 cubic feet or 7,800 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old.

The Toiyabe soil is suited to the production of Jeffrey pine. Based on a site index of 35, the potential production per acre of merchantable timber is 240 cubic feet or 400 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old.

The main concerns in producing and harvesting trees in areas of this complex are the steep slopes and very low available water capacity. Management that minimizes the risk of erosion is essential in harvesting trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The very low available water capacity generally influences seedling survival. Conventional methods of harvest are difficult to use because of the steepness of slope. The highlead logging method is more efficient than most other methods and is less damaging to the soil surface.

Areas of this complex are limited for roads because of steep slopes. Roads should be located on the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and to reduce maintenance costs. Roads should be designed to provide adequate surface drainage.

This complex is in capability subclass VIIe, nonirrigated.

1073—Corbett-Toiyabe association. This association is on summits and side slopes of mountains. Slope is 4 to 8 percent. Elevation is 5,500 to 5,700 feet. The average annual precipitation is about 18 inches, the average annual temperature is about 44 degrees F., and the average frost-free period is about 80 days.

This association is 60 percent Corbett loamy coarse sand, 4 to 8 percent slopes, and 30 percent Toiyabe loamy coarse sand, 4 to 8 percent slopes. The Corbett soil is on the side slopes, and the Toiyabe soil is on summits.

Included with these soils in mapping are about 5 percent loamy-skeletal, mixed, frigid Entic Haploxerolls on pediments (woodland site: Pine woodland), 3 percent mixed, frigid Dystric Xeropsamments on toe slopes (woodland site: Pine woodland), and 2 percent Rock outcrop on ridges. Also included are a few small areas of Toiyabe soils on steep slopes. The included soils and Rock outcrop make up about 10 percent of mapped areas.

The Corbett soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 2 inches thick. The surface layer is grayish brown loamy coarse sand about 7 inches thick. The underlying material to a depth of 38 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 38 inches.

Permeability of the Corbett soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 24 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface is covered with a mat of pine needles and leaves about 2 inches thick. The surface layer is dark grayish brown loamy coarse sand about 7 inches thick. The underlying material to a depth of 14 inches is light brownish gray gravelly loamy coarse sand. Granitic bedrock is at a depth of 14 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 10 to 20 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for woodland and wildlife habitat.

The Corbett soil is suited to the production of Jeffrey pine. Based on a site index of 62, the potential

production per acre of merchantable timber is 2,000 cubic feet or 7,800 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concern in producing and harvesting trees is the very low available water capacity.

The Toiyabe soil is suited to the production of Jeffrey pine. Based on a site index of 35, the potential production per acre of merchantable timber is 240 cubic feet or 400 board feet (Scribner rule) from an even-aged, fully stocked stand of trees 100 years old. The main concerns in producing and harvesting trees are the very low available water capacity and the shallow depth to bedrock.

In areas of these soils, the very low available water capacity delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The young trees can be cut for use as Christmas trees.

Areas of this association are limited for roads because of shallow depth to bedrock on the Toiyabe soil. Because of the underlying bedrock, deep cuts should be avoided. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Corbett soil is in capability subclass VIIs, nonirrigated. The Toiyabe soil is in capability subclass VIIe, nonirrigated.

1081—Zephan association. This association is on low rolling hills. Slope is 4 to 30 percent. Elevation is 5,000 to 5,300 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Zephan very stony sandy loam, 15 to 30 percent slopes, and 25 percent Zephan gravelly sandy loam, 4 to 15 percent slopes. The Zephan very stony soil is on side slopes and foot slopes, and the Zephan gravelly soil is on crests and shoulders.

Included with these soils in mapping are about 5 percent Chalco soils on old terraces (range site: 26-29), 5 percent loamy-skeletal mixed, mesic Xerollic Haplargids on ridges (range site: 26-42), and 5 percent shallow Theon soils on south-facing slopes (range site: 27-19). The included soils make up about 15 percent of mapped areas.

The Zephan very stony soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is grayish brown very stony sandy loam about 5 inches thick. The subsoil is yellowish brown and about 21 inches thick. It averages very cobbly clay. Soft weathered andesite bedrock is at a depth of 26 inches.

Permeability of the Zephan very stony soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Zephan gravelly soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. The surface layer is light brownish gray gravelly sandy loam about 3 inches thick. The subsoil is yellowish brown very cobbly clay about 26 inches thick. Soft weathered andesitic bedrock is at a depth of 29 inches.

Permeability of the Zephan gravelly soil is slow. Available water capacity is very low. Effective rooting depth coincides with the depth to bedrock. The depth is 25 to 40 inches. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Zephan very stony soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the moderately low average annual precipitation, very low available water capacity, and a thin surface layer over a clayey B horizon.

The potential plant community on the Zephan gravelly soil is mainly low sagebrush, Thurber needlegrass, bottlebrush squirreltail, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the very thin surface layer over a clayey B horizon.

Seeding large areas of the Zephan very stony soil is difficult. This is because of the pattern in which the very stony soil occurs with the Zephan gravelly soil. Because of the moderately low average annual precipitation and the competition from sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce vegetation suitable for grazing.

Areas of this association are limited for roads because of low, moderately steep slopes and the highly expandable clay. Roads are difficult to maintain because

of the clay, which has low strength when wet. Roads should be located in the less sloping areas if possible to avoid excessive cutting and filling. Disturbed areas need to be stabilized to minimize erosion and reduce maintenance costs. Roads should be designed to provide surface drainage.

The Zephan very stony soil is in capability subclass VIIs, nonirrigated, and range site 26-25. The Zephan gravelly soil is in capability subclass VIs, nonirrigated, and range site 26-25.

1091—Uhaldi-Nosrac association. This association is on side slopes of hills. Slope is 30 to 50 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 48 degrees F., and the average frost-free period is about 100 days.

This association is 60 percent Uhaldi stony loam, 30 to 50 percent slopes, and 25 percent Nosrac very stony loam, 30 to 50 percent slopes. The Uhaldi soil is on south- and west-facing side slopes, and the Nosrac soil is on convex or uniform, north-facing side slopes.

Included with these soils in mapping are about 10 percent Burnborough soils on concave, north-facing slopes (range site: 26-5) and 5 percent Verdico soils on hill crests (range site: 26-23). The included soils make up about 15 percent of mapped areas.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface layer is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 5 inches thick. The upper 11 inches of the subsoil is dark grayish brown gravelly clay loam, and the lower 8 inches is pale brown gravelly clay loam. Weathered Teritary mudstone is at a depth of 24 inches.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to weathered Tertiary mudstone. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in colluvium derived dominantly from metasedimentary rock. Typically, the surface is covered with 10 to 15 percent stones. The surface layer is grayish brown very stony loam about 13 inches thick. The upper 21 inches of the subsoil is brown very gravelly clay loam, and the lower part to a depth of 60 inches is pale brown very gravelly loam.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The potential plant community on the Nosrac soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation suitable for livestock grazing is limited by the moderate available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

The steepness of slope limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas. Mechanical treatment is not practical, because the surface is stony and the slopes are steep. If shrubs are managed to establish open areas, a good stand of desirable grasses and forbs is possible. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas, the soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of steep slopes. Special design for roads is needed to overcome the limitation of slope. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

The Uhaldi soil is in capability subclass VIIe, nonirrigated, and range site 26-5. The Nosrac soil is in capability subclass VIIs, nonirrigated, and range site 26-5.

1101—Pung-Phing-Chalco association. This association is on terraces. Slope is 8 to 50 percent. Elevation is 5,500 to 6,600 feet. The average annual precipitation is about 10 inches, the average annual temperature is about 49 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Pung stony loam, 15 to 30 percent slopes, 25 percent Phing very gravelly loam 8 to 15 percent slopes, and 20 percent Chalco very stony loam, 30 to 50 percent slopes, eroded. The Pung soil is

on north- and east-facing tops of terraces, the Phing soil is on south- and west-facing tops of terraces, and the Chalco soil is on steep side slopes of terraces.

Included with these soils in mapping are about 6 percent Shree soils on alluvial fans in the upper part of the landscape (range site: 26-10), 7 percent Greenbrae soils on alluvial fans and stream terraces in the lower part of the landscape (range site: 26-16), 1 percent Brockliss Variant soils on drainageways near springs (range site: 26-3), and 1 percent Brockliss Variant soils, drained, along drainageways (range site: 26-30). The included soils make up about 15 percent of mapped areas.

The Pung soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 6 inches thick. The subsoil is brown and yellowish brown and about 24 inches thick. It averages clay. The substratum to a depth of 60 inches or more is very pale brown loam and sandy loam. In a few small areas, slope is 8 to 15 percent.

Permeability of the Pung soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Phing soil is very deep and well drained. It formed in mixed alluvium. Typically, the surface layer is light brownish gray very gravelly loam about 2 inches thick. The subsoil is yellowish brown clay about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown silty clay loam.

Permeability of the Phing soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from Tertiary mudstone. Typically, the surface is covered with 3 to 15 percent stones. The surface layer is light brownish gray very stony loam about 4 inches thick. The subsoil is brown clay about 13 inches thick. Tertiary mudstone bedrock is at a depth of 17 inches. Moderate rill and sheet erosion has removed between 25 and 75 percent of the original topsoil. In a few small areas slope is 8 to 15 percent.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pung soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and pine bluegrass. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the thin surface layer over a clay subsoil and the moderately steep slopes.

The potential plant community on the Phing soil is low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of vegetation suitable for livestock grazing is limited by the moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is the thin surface layer over a clay subsoil.

The potential plant community on the Chalco soil is mainly Wyoming big sagebrush, antelope bitterbrush, Indian ricegrass, and bottlebrush squirreltail. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Indian ricegrass, and bottlebrush squirreltail with invasion of juniper and pinyon. The production of vegetation suitable for livestock grazing is limited by very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steep slopes and very low available water capacity.

Seeding large areas of the Pung soil is difficult. This is because of the pattern in which the Pung soil occurs with the Phing and Chalco soils. Because of the competition from pinyon, juniper, and sagebrush, desirable grasses are very slow to recover even if grazing management is good. Because of the density of pinyon and juniper, the soils can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Livestock grazing should be managed to protect the soils from excessive erosion. Loss of the surface layer results in a severe decrease in productivity and in the potential of the soils to produce plants suitable for grazing.

Areas of this association are limited for roads because of the presence of highly expandable clay and because of moderately steep and steep slopes on the Pung and Chalco soils. Roads are difficult to maintain because the clay has low strength when wet. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pung soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Phing soil is in

capability subclass VIIs, nonirrigated, and range site 26-25. The Chalco soil is in capability subclass VIIs, nonirrigated, and range site 26-29.

1102—Pung-Pula-Uhaldi association. This association is on terrace tops and side slopes. Slope is 8 to 50 percent. Elevation is 6,000 to 7,400 feet. The average annual precipitation is about 12 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 40 percent Pung stony loam, 8 to 15 percent slopes, 25 percent Pula very cobbly loam, 15 to 30 percent slopes, and 20 percent Uhaldi stony loam, 30 to 50 percent slopes. The Pung soil is on tops and upper side slopes of terraces, the Pula soil is on south- and west-facing lower side slopes of terraces, and the Uhaldi soil is on north-facing side slopes of terraces.

Included with these soils in mapping are about 5 percent Shree soils on alluvial fans at the base of terraces (range site: 26-10), 5 percent Haybourne soils on inset alluvial fans (range site: 26-16), and 5 percent Chalco soils on steep, south- and west-facing terrace shoulders (range site: 26-25). The included soils make up about 15 percent of mapped areas.

The Pung soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is brown stony loam about 6 inches thick. The subsoil is brown clay about 24 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam that has hard durinodes below a depth of about 40 inches.

Permeability of the Pung soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Pula soil is very deep and well drained. It formed in alluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with 10 to 20 percent cobbles. The surface layer is grayish brown very cobbly loam about 5 inches thick. The subsoil is yellowish brown extremely gravelly clay about 25 inches thick. The substratum to a depth of 60 inches or more is very pale brown extremely gravelly sandy loam.

Permeability of the Pula soil is slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Uhaldi soil is moderately deep and well drained. It formed in colluvium derived dominantly from Tertiary mudstone. Typically, the surface is covered with about 2 percent stones. The surface layer is grayish brown stony loam about 10 inches thick. The subsoil is light yellowish brown gravelly clay loam about 25 inches thick. Tertiary mudstone is at a depth of 35 inches.

Permeability of the Uhaldi soil is moderately slow. Available water capacity is low. Effective rooting depth coincides with the depth to Tertiary mudstone. The depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Pung soil is mainly low sagebrush, antelope bitterbrush, Thurber needlegrass, and pine bluegrass. The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of vegetation suitable for livestock grazing is limited by the moderate average annual precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is a thin surface layer over a clay subsoil.

The potential plant community on the Pula soil is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and basin wildrye. The present vegetation in most areas is mainly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail with invasion of pinyon and juniper. The production of vegetation is limited by the very low available water capacity and moderately low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is very low available water capacity in the surface layer.

The potential plant community on the Uhaldi soil is mainly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. The present vegetation in most areas is mainly mountain big sagebrush, antelope bitterbrush, and western needlegrass with invasion of pinyon and juniper. The production of vegetation is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitation for seeding is steep slopes.

Seeding large areas of the Pung soil is difficult. This is because of the pattern in which the Pung soil occurs with the Pula and Uhaldi soils. Steepness of slope in areas of Uhaldi soil limits access and movement of livestock. Livestock grazing should be managed to protect the soils from excessive erosion and to prevent overgrazing in the less sloping areas of Pung and Pula soils. Loss of the surface layer results in a severe decrease in productivity and in the potential of the Pung soil to produce vegetation suitable for grazing. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Because of the density of pinyon and juniper in most areas of the Pula and Uhaldi soils, they can be managed for woodland. Reestablishment of the rangeland plant community in some areas is difficult.

Areas of this association are limited for roads because of highly expandable clay in the Pung soil and because

of moderately steep and steep slopes on the Pula and Uhaldi soils. Roads on the Pung soil are difficult to maintain because of the clay, which has low strength when wet. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

The Pung soil is in capability subclass VIIs, nonirrigated, and range site 26-23. The Pula soil is in capability subclass VIIs, nonirrigated, and range site 26-10. The Uhaldi soil is in capability subclass VIIe, nonirrigated, and range site 26-5.

1111—Stucky extremely cobbly sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rock but also from mixed sources of rock. Elevation is 5,000 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 120 days.

Typically, the surface is covered with 40 to 60 percent cobbles. The surface layer is light brownish gray extremely cobbly sandy loam about 8 inches thick. The upper part of the subsoil is light brown very cobbly sandy clay loam about 20 inches thick, and the lower part to a depth of 60 inches is light brown, stratified extremely cobbly sandy clay loam. In some areas slope is 0 to 4 percent.

Included with this soil in mapping are about 10 percent Haybourne soils on inset alluvial fans (range site: 26-16) and 5 percent Reno soils on pediments (range site: 26-25).

Permeability of this Stucky soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this soil are used for livestock grazing and wildlife habitat.

The potential plant community on this soil is mainly low sagebrush, desert needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by the low average annual precipitation. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the extremely cobbly surface, very low available water capacity of the surface layer, and low average annual precipitation. Because of the low average annual precipitation and the competition from the sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this soil are limited for roads because of the extremely cobbly surface. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increase maintenance cost. Roads should be provided with adequate surface drainage.

This soil is in capability subclass VIIs, nonirrigated. It is in range site 26-47.

1112—Stucky association. This association is on dissected alluvial fans. Slope is 8 to 30 percent. Elevation is 5,300 to 5,500 feet. The average annual precipitation is about 8 inches, the average annual temperature is about 50 degrees F., and the average frost-free period is about 100 days.

This association is 55 percent Stucky very cobbly loam, 8 to 15 percent slopes, and 30 percent Stucky very cobbly loam, 15 to 30 percent slopes. The Stucky soil, 8 to 15 percent slopes, is on south- and west-facing slopes, and the Stucky soil, 15 to 30 percent slopes, is on north- and east-facing slopes.

Included with these soils in mapping are about 10 percent Haybourne soils on inset alluvial fans and (range site: 26-16) 5 percent Reno soils on higher fan remnants (range site: 26-25). The included soils make up about 15 percent of the mapped areas.

The Stucky soil, 8 to 15 percent slopes, is very deep and well drained. It formed in alluvium derived dominantly from granitic rock, but also from mixed sources of rock. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is light brownish gray very cobbly loam about 3 inches thick. The subsoil is pale brown and brown very cobbly sandy clay loam about 18 inches thick. The substratum to a depth of 60 inches or more is stratified, very pale brown extremely cobbly sandy loam to very stony clay loam.

Permeability of the Stucky soil, 8 to 15 percent slopes, is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

The Stucky soil, 15 to 30 percent slopes, is very deep and well drained. It formed in alluvium derived dominantly from granitic rock, but also from mixed sources of rock. Typically, the surface is covered with 25 to 35 percent cobbles. The surface layer is grayish brown very cobbly loam about 5 inches thick. The subsoil is pale brown and brown very cobbly sandy clay loam about 20 inches thick. The substratum to a depth of 60 inches or more is very pale brown, stratified extremely cobbly sandy loam to very stony clay loam.

Permeability of the Stucky soil, 15 to 30 percent slopes, is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazards of water erosion and soil blowing are slight.

Areas of this association are used for livestock grazing and wildlife habitat.

The potential plant community on the Stucky soils is mainly low sagebrush, desert needlegrass, and Sandberg bluegrass. The present vegetation in most areas is mainly low sagebrush and desert needlegrass. The production of vegetation suitable for livestock grazing is limited by low average annual precipitation. The suitability of these soils for rangeland seeding is very poor. The main limitations for seeding are the very low available water capacity of the surface layer and the low average annual precipitation.

Livestock grazing should be managed to avoid overuse of the less sloping areas. Because of low average annual precipitation and competition from the low sagebrush for moisture, desirable grasses are very slow to recover even if grazing management is good. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure.

Areas of this association are limited for roads because of the moderately steep slopes and the very cobbly surface. Unless an adequate wearing surface is maintained, stones and cobbles in the soil are road hazards and result in increased maintenance costs. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance cost reduced by stabilizing areas that have been disturbed.

These Stucky soils are in capability subclass VIIs, nonirrigated, and range site 26-47.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U. S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops. If it is properly treated and high level management and acceptable farming methods are used, prime farmland produces the highest yields with minimal inputs of energy and economic resources, and its use results in the least damage to the environment.

Prime farmland in the survey area can be in cropland, pastureland, woodland, or other land uses but not in urban land, built-up land, or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and an acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 4 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 17,500 acres or 4.5 percent of Douglas County Area meets the requirements for prime farmland provided adequate irrigation water is available.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, difficult to cultivate, and less productive.

Soil map units that qualify for prime farmland in Douglas County Area are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

For a soil to qualify for prime farmland in the survey area, a full supply of water is needed for irrigation. Therefore, the map units listed qualify only where a full irrigation supply exists. Onsite evaluation may be needed.

191 Cradlebaugh clay loam, drained, slightly saline-alkali

193 Cradlebaugh clay loam, slightly saline-alkali

221 East Fork Variant loam

241 Dressler coarse sandy loam

271 East Fork loam

272 East Fork clay loam

311 Gardnerville clay loam

312 Gardnerville clay loam, drained

313 Gardnerville clay loam, slightly saline-alkali

314 Gardnerville clay

315 Gardnerville clay, slightly saline-alkali

381 Greenbrae fine sandy loam, 0 to 4 percent slopes

382 Greenbrae gravelly fine sandy loam, 4 to 8 percent slopes

391 Haybourne sand, 0 to 4 percent slopes

392 Haybourne loam, 0 to 2 percent slopes

393 Haybourne loam, 2 to 4 percent slopes

394 Haybourne fine sandy loam, gravelly substratum, 0 to 2 percent slopes

401 Heidtman clay loam

402 Heidtman clay loam, clay substratum

422 Henningsen Variant loam

461 Hussman silty clay loam

463 Hussman clay

501 James Canyon loam, drained, 2 to 4 percent slopes

502 James Canyon loam, drained, 4 to 8 percent slopes

521 Job loam

852 Settlemeyer clay loam, drained

982 Turria loam

985 Turria clay loam, wet

986 Turria silty clay loam

1061 Washoe gravelly sandy loam, 0 to 2 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants ar listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The aim of good land use is to produce the greatest amount of the most needed crops and, at the same time, protect and improve the soil. To achieve this aim, the land must be protected according to its needs and used within its capabilities. This can be done by using plants that are well suited to the soil, applying soil management practices that protect the soil, and keeping the soil in good tilth. Also, the crops grown must be climatically adapted to the length of the frost-free period.

In the following paragraphs the major soil management practices needed in the survey area are generally described. Although the soils in the survey area differ in management needs, certain practices apply to all of the soils that are cultivated.

Conservation cropping systems .—A conservation cropping system is the growing of crops in combination with needed cultural and management practices. If the effects of soil-improving crops and practices more than offset the effects of soil-depleting crops and deteriorating practices, then the conservation cropping system is good.

Soil-improving practices in a conservation cropping system include the growing of grasses and legumes, the return of crop residue to the soil, proper tillage, adequate fertilization, weed- and pest-control measures, and other good management practices.

Several cropping systems are used in the survey area. A typical system is alfalfa grown for about 6 to 8 years, small grain grown for 2 years, and then alfalfa grown with a protective nurse crop of small grain. The crop residue of the small grain is returned to the soil, and tillage is reduced to only those operations that are necessary.

Crop residue management .—Crop residue management is the use of plant residue left in cultivated fields. The residue is incorporated into the soil, or is left on the surface during that part of the year when erosion is likely. Plant residue adds organic matter. A major benefit of organic matter in the soil is its influence on the development and stabilization of good tilth and its relationship to the general physical environment of the

soil, which influences crop growth. Organic matter functions mainly as it decomposes. The application of nitrogen fertilizer to the soil aids in this process.

Returning organic matter to the soil continuously is particularly important. The easiest and most common method of adding organic matter to the soil is to return plant residue produced by a crop. Unless sufficient crop residue is returned to the soil, tilth of the soil declines, soil compaction starts, and slower water infiltration and poorer aeration result.

Erosion control.—Erosion control prevents the excessive wearing away of the land surface by wind, running water, and other geological agents. Protection of the surface layer is important because the surface layer contains most of the organic matter and generally is more fertile than the subsoil. Erosion can be controlled by using cover crops to protect the surface during windy or stormy periods, by leveling the surface in spring and immediately seeding, and by leveling irrigated soils to the proper grade and applying water at the proper rate.

Addition of plant nutrients.—Most of the irrigated soils used for crops in this survey area respond well to liquid or solid fertilizer. The specific fertilizer needed depends on the kind of crop grown and the nutrient level in the soil. Applying a combination fertilizer that contains nitrogen and phosphorus increases production of small grain and aids in establishing alfalfa. Thereafter, alfalfa benefits from phosphate applied every 2 years for the life of the stand, except where the soil contains enough available phosphorus.

Applications of barnyard manure add nitrogen, phosphorus, and potassium to the soil and promote good tilth. If available, barnyard manure can be used with good results before planting corn or small grains.

Irrigation water management.—Irrigation water management requires the regulation of applications of irrigation water at rates and amounts that will insure high crop production and minimum soil and water losses. Such management is needed in all irrigated areas. Good irrigation management means applying water according to the crop needs and at rates and in amounts consistent with the characteristics of the soil.

Efficient delivery of water to farms is the first step in supplying the moisture needed by growing crops. A good distribution system has enough capacity to meet the needs of the crops irrigated, is so located and controlled that seepage losses are negligible, and carries the required flow safely.

Next, the water must be delivered from the distribution system to the individual fields. An efficient system for transporting water on a farm or ranch is designed and constructed so that it carries the required flow without excessive seepage and without causing erosion. Control structures are needed to facilitate the handling of water.

The design of an irrigation system is governed by the method of irrigation to be used, the amount of land leveling needed, and the expected efficiency in applying water. In this survey area two methods of irrigation are commonly used: border and corrugation. Border irrigation consists of applying water to strips of varying width. These strips are separated by low dikes or border ridges. This method of irrigation is suitable on fields of close-growing crops. It can be used on all soils except those that have a high intake rate and poor lateral movement of water. Corrugation irrigation applies water in small continuous channels evenly spaced across the field. Water flowing in the corrugations soaks into the soil and spreads laterally to irrigate the area between corrugations. All close-growing, noncultivated crops can be irrigated by this method. Corrugations are best used on fine to moderately coarse textured soils. They are not suitable for coarse-textured soils that have a high intake rate or saline soils.

If the water is to be applied efficiently, a farmer needs to know the capacity of the soil to hold water that plants can use, the rate that water enters and moves through the soil, and the amount of water required by the crop. Most crops should be irrigated when 40 to 50 percent of the available moisture has been depleted from the top half of the root zone of the plant. Forty-eight hours after irrigation, a soil check can be made to determine if the desired moisture has been added.

Drainage.—A fluctuating water table is present in the soils on the low flood plains. One major factor contributing to the high water table is the seepage of water from the Carson and Walker Rivers and other contributing streams. In addition, the application of irrigation water causes the water table to rise.

In soils that are inadequately drained, soluble salts and alkali accumulate and retard or prevent the growth of crops. Soils that are inadequately drained also have poor soil aeration, which reduces the growth of plants and increases the susceptibility of plants to disease.

Even if soils are moderately well drained to well drained, they must have drainage established if they are to be reclaimed. The reclamation processes require large amounts of water to leach the salts from the root zone and drains to dispose of surface and subsurface water.

Managing saline-alkali soils.—Like most soils in arid and subarid regions, the soils on alluvial fans and flood plains contain at least small quantities of soluble salts and alkali. Because rainfall is low and evaporation is high, percolating rainfall is insufficient to leach salts out of the root zone. In some soils the salts and alkali are highly concentrated and limit or prevent the growth of crops. In addition, many low lying areas receive salty water from runoff or seepage. Surface evaporation of such water generally results in a further increase of soluble salts on or in the soils. In some areas that have a high water table, water may rise in the soil by capillary action and carry dissolved salts with it. Soluble salts are readily dissolved in water and can move to any part of the soil profile.

A soil that contains excessive amounts of soluble salts but not alkali is called a saline soil. One that contains excessive absorbed sodium is called an alkali soil. A soil that contains both excess soluble salts and alkali is described as saline-alkali.

Saline-alkali phases of several of the soils in the survey area have been mapped. The map unit name does not give the degree to which these soils are affected, nor does it indicate if the soils contain both salt and alkali. This information, however, is given in the map unit description. Three saline and alkali classes used in soil phases are—

- Soils that are free of excess salts and alkali and are less than 0.15 percent salts. The conductivity of the saturation extract is less than 4 millimhos per centimeter at 25 degrees C in soils of this class, and the total content of exchangeable sodium is less than 15 percent.
- Slightly saline-alkali soils that are 0.15 to 0.35 percent salts. The conductivity of the saturation extract is 4 to 8 millimhos per centimeter at 25 degrees. Moderately coarse, medium, moderately fine, and fine textured soils in this class are 15 to 20 percent exchangeable sodium.
- Strongly saline-alkali soils that are more than 0.65 percent salts. The conductivity of the saturation extract is greater than 15 millimhos per centimeter at 25 degrees. Moderately coarse, medium, moderately fine, and fine textured soils in this class are more than 25 percent exchangeable sodium.

Although a distinct gap occurs between the second class and the third class, an intermediate or moderate class is not needed in this area because only a very small percentage of the samples analyzed in this survey area was moderately saline-alkali.

Some soils mapped as slightly saline-alkali are free of excess salts and alkali in the upper 4 or 5 inches but contain slight or moderate concentrations just below the plow layer. Several soils mapped as strongly saline-alkali are only slightly affected in the plow layer.

Soils differ in the kinds of salt they contain and in the practices needed for their improvement. For this reason, each soil requires individual treatment; however, some helpful general guidelines are given in the following paragraphs.

A good supply of irrigation water and adequate drainage must be provided to reclaim any soil in this area. Two methods of applying water are commonly used. One method is to level the areas to flat basins and then pond the water within these basins. The other method requires that the areas be leveled to a uniform grade and then flooded between the border dikes. If drainage is adequate and large amounts of water are used, either method is effective in leaching the soluble salts out of the root zone. If the soils contain an excessive amount of absorbed sodium, the process is more difficult. In addition to drainage and leaching, other practices are needed for the improvement of alkali soils.

Chemical amendments used to replace sodium are gypsum and its various forms, including gypsite, anhydrite, and selenite, as well as elemental sulfur, sulfuric acid, iron sulfate, and aluminum sulfate. Any of these amendments can be successfully used, though the action is faster with some than with others. Cost and availability generally determine the choice. The amount of amendment needed for improving a soil is determined by laboratory analyses of soil samples. These analyses indicate the amount of sodium that must be replaced if the soil is to be improved.

Because the amount of soluble salts and alkali may differ within short distances, the sampling shows only the average concentrations in a field. If some alkali spots remain after the first treatment, they can be corrected the following year. An estimate of the amount of amendments needed should not be based on an analysis of the most strongly alkali spots, because the estimate could be two to five times greater than the amount actually needed.

If an amendment other than gypsum or sulfur is used, the relative amount needed can be determined from the following list of amendments and the number of tons of amendment equivalent to 1 ton of sulfur:

	Tons
Sulfur	1.00
Sulfuric acid	3.06
Gypsum	5.38
Iron sulfate	8.69
Alumimum sulfate	6.94

Iron sulfate and aluminum sulfate act quickly, but high cost prohibits their general use.

For efficiency in replacing sodium, most of the soluble salts should be leached before applying chemical amendments. If the soluble salts are removed, more calcium is available for replacing absorbed sodium. For soil improvement, however, the efficient removal of sodium by leaching before amendments are applied may be more than offset by the decrease in soil permeability that generally accompanies the leaching of salts from saline-alkali soils. The resulting permeability, therefore, determines whether amendments should be applied before or after soluble salts are removed. In this survey area, it is advisable to remove part of the salts through leaching before the amendment is applied.

Chemical amendments normally are broadcast and incorporated into the soil by light disking. Sulfur should be thoroughly mixed with the soil to insure rapid oxidation to the sulfate form. Some amendments can be added to the irrigation water. Gypsum dissolves so slowly, however, that the amount that can be applied in irrigation water is less than the amount needed by the soil.

Except where sulfur is used, saline-alkali soils should be leached immediately after the amendment is applied.

Leaching dissolves the amendment and carries it downward, and it also removes the soluble salts that form as the absorbed sodium is replaced by calcium.

Where sulfur is applied, sufficient time should be allowed before leaching so that the sulfur is oxidized and reacts with the lime to form gypsum. The soil must be kept moist, however, because water is needed for oxidation of sulfur. Consequently, fall is the most favorable season for applying sulfur.

An alternative to reclamation through use of large quantities of gypsum is the seeding of salt- and alkali-tolerant grasses. Among the grasses well suited are tall wheatgrass and alta fescue. These grasses can grow in relatively strong concentrations of both soluble salts and alkali.

In using grass to improve an area, the greatest difficulty is getting a satisfactory stand. High concentrations of salts delay germination and limit the absorption of water. In addition, seeds may not germinate after the first irrigation, or even after the second or third. Seeds that fail to germinate eventually rot.

The second stage in establishing grass is the growth of seedlings upward through the soil. If a saline-alkali soil dries out, it tends to bake and to crust. If the surface is severely crusted, seedlings cannot break through and they die.

Frequent, light irrigation can be used to reduce the salt accumulation around the seeds and prevent crusting. The soil may need to be irrigated every 3 to 5 days until the crop has grown to a height of 3 to 5 inches. Applying a small amount of gypsum or sulfur, generally 2 to 4 tons per acre, helps to prevent crusting and allows seedlings to emerge.

Proper pasture management.—Proper pasture management is grazing the pasture at a rate that maintains grasses and legumes of high quality. This objective can be accomplished by adjusting the stocking rates or season of use to favor maximum growth and survival.

A common method of pasture management is a rotation grazing system in pasture areas that allows adequate regrowth of plants. Care should be taken to keep the livestock off the pasture when it is wet. If livestock is allowed to graze when the pasture is wet, the soil compacts, the intake rate decreases, and the structure of the soil is destroyed. The pasture should have proper irrigation water management, and drainage should be provided. Increased yields can be obtained by applying commercial fertilizer and barnyard manure. Weeds generally can be controlled with a drag each spring.

Hayland management.—Hayland management is the proper treatment and use of hayland to prolong the life of desirable forage species, to maintain or improve the quality and quantity of the forage, and to protect the soil and reduce the water loss. Management includes the establishment and renovation of alfalfa hayfields and meadow fields with long-term stands of adapted species.

Crop yields can be effectively increased by using adapted species. If hayland is renovated or established, plants should be selected that withstand climatic extremes and still produce high yields during the relatively short growing season. The seed should be high quality and certified. Inoculated seed should be used in planting. Land leveling, grading, shaping, and subsoiling operations should be completed prior to seedbed preparation. Growing an annual crop for a year prior to reestablishing a forage crop allows for final smoothing and erosion control. Seed can be drilled directly into stubble of the preceding annual crop. Irrigation prior to planting may be necessary to prepare a seedbed.

Companion crops may be needed if soil blowing is a hazard. Disease can be controlled by the use of resistant species, crop rotation, and proper irrigation management.

Fertilization is essential to ensure that growth factors are not limiting. The fertilization rate depends on the soil and on the crop grown.

In the management of established stands, the frequency and amount of the irrigation water applied should be regulated. The frequency and amount of irrigation water applied depends on the available water capacity of the soil and the rate of removal of water from the soil by evapotranspiration. Subirrigation requires special irrigation water management to control the level of the water table and prevent the accumulation of excessive soluble salts.

Native meadows used as hayland have low forage production because there is an excess of uncontrolled runoff water in spring and generally a shortage of water in summer. Improvements should include water management, fertilization, and control of excessive salts and alkali.

The soil-forming process, notably weathering of parent material high in granitic rock in restricted drainage conditions, produces soils that contain high concentrations of molybdenum. (*7*). Cattle whose diet contains a large amount of clover grown in soil produced under these conditions may show evidence of molybdenum toxicity.

In some areas, the granitic rock can contain a relatively large amount of molybdenum as molybdenite. The highest concentration of molybdenum occurs in very poorly drained soils that have thick mollic or histic epipedons. Kimmerling loam, wet; Ophir; and Shalcar family soils are typical of soils that formed in material high in molybdenum.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be

higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Rangeland

John Capurro, soil conservationist, Soil Conservation Service, helped to prepare this section.

About 70 percent of the survey area is rangeland. Most of the income from the rangeland is derived from the sale of cattle and sheep. Grazing is mainly from April through October. Rangelands are privately owned or administered by the Bureau of Land Management, Bureau of Indian Affairs, or the Forest Service. Urban development is gradually encroaching on the more gently sloping parts of the rangeland.

The native vegetation in many parts of the survey area has been greatly depleted, changed, or depleted and changed from its potential. Early trail herds that used the range excessively, fires, mining explorations, and injudicious use of off-road vehicles have contributed to

this. Trees, sagebrush, rabbitbrush, and other less desirable forage vegetation grow in areas that once produced abundant stands of desirable perennial grasses and shrubs. Cheatgrass and other annuals, mostly forbs, that have invaded an extensive part of the area make use of available soil moisture stored from winter snow and spring rain. As desirable species are depleted or grazed out, the soil becomes more susceptible to erosion, soil blowing, and increased runoff and to the invasion of less desirable species.

In recent years, the number of wild horses has greatly increased, causing additional range depletion. Several grazing allotments have not grazed livestock for several years, yet the range condition continues to deteriorate. Unrestricted, yearlong grazing by the wild horses has caused this downward trend in some areas of rangeland.

A major concern of most rangeland management is managing the grazing so that the kind and amount of plants that make up the potential plant community are maintained or reestablished.

If the range is overgrazed, the proportion of preferred forage plants decrease and less desirable plants increase. Therefore, all grazing should be managed so that the desired balance of species is maintained in the plant community. If preferred vegetation is seriously depleted, seeding is needed where the soil and climatic conditions are favorable. Brush management can improve depleted areas that are producing more woody shrubs than were present in the potential plant community.

Management practices for range maintenance and rehabilitation include proper grazing use, deferred grazing, planned grazing systems, brush management, and range seedling.

Overgrazing and natural fire suppression have caused large areas of the Pine Nut Mountains and adjacent foothills and the Wellington Hills to be invaded by pinyon and juniper trees. The trees have replaced forage species that are desirable for livestock, wildlife, and horses.

Where the pinyon and juniper trees have invaded the native plant community, the understory vegetation available for grazing can be improved by chaining the trees where practical, harvesting Christmas trees, or cutting trees for firewood and fence posts. The areas should then be seeded where necessary.

In some map units, the included areas of soils produce more forage suitable for grazing than the major soils. These inclusions should be considered in rangeland management plans.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as or are suited to rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre reduced to a common percent of air-dry moisture.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of

vegetation, reduction of undesirable brush species, conservation of water, and control of water erosion and soil blowing. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

John Capurro, soil conservationist, Soil Conservation Service, helped prepare this section.

Three major woodland types are within the survey area. The first two types, Pine woodland and mixed Pine-fir woodland, are in the Carson Range and occupy about 6 percent of the survey area. The third type, Pinyon-juniper woodland, is in the eastern part of the survey area and occupies about 11 percent. Some small areas of aspen woodland are scattered throughout the mountainous areas.

The Pine woodland is at an elevation of 5,000 to 7,500 feet. Jeffrey pine is dominant with an understory of predominantly mountain big sagebrush, curlleaf mountainmahogany, pointleaf manzanita, Thurber needlegrass, and mountain brome.

The mixed Pine-fir woodland is at the higher elevations, generally above 7,500 feet. California red fir and western white pine are dominant with an understory of pinemat manzanita, greenleaf manzanita, snowbush ceanothus, sqawcarpet, and golden chinkapin.

Areas of the Pine-fir woodland and Pine woodland are suitable for sawtimber. Timber stands are vital in maintaining the watershed and in protecting the highly erodible soils. They are also needed for wildlife habitat, recreation, and esthetic values. Woodlands should be protected from fires, and good timber harvesting management should be used.

The Pinyon-juniper woodland is dominated by singleleaf pinyon and Utah juniper. At lower elevations, the understory is dominantly Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass, and bottlebrush squirreltail. At higher elevations the understory is dominantly mountain big sagebrush, antelope bitterbrush, western needlegrass, and mountain brome. Cutting of trees for firewood is the most common use. Other uses are Christmas trees and fenceposts. Pine nuts are harvested in favorable years.

The small areas of aspen woodland are dominated by quaking aspen. These sites occur on north-facing slopes and near some of the moist meadows. The understory on north-facing slopes is dominantly mountain brome, basin wildrye, and mountain big sagebrush. The understory on the moist meadow is dominantly redtop, timothy, Baltic rush, willow, and golden currant. This woodland is used for wildlife habitat.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where

there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, hold snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or

stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

John Capurro, soil conservationist, Soil Conservation Service, helped prepare this section.

Wildlife is a valuable resource in the survey area. It provides opportunities for such outdoor activities as hunting and fishing. The rapid rate of urbanization in the area increases the importance of improving and maintaining wildlife habitat.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Wildlife is a product of the soil and like other crops responds to good management. The level of production of adapted wildlife usually is in balance with essential habitat containing food and cover. Most managed wildlife habitat is created, improved, or maintained by planting suitable vegetation, by manipulating existing vegetation to increase the establishment of desired plants, or by a combination of both. The complete habitat elements needed by a specific species of wildlife generally require several kinds of soil and a combination of land uses. For this reason, interpretations of the soils for wildlife habitat can be related to the map units described in the section "General Soil Map Units."

In the following paragraphs the general soil map units of the survey area are described as wildlife areas that differ in potential species and environmental factors.

Wildlife Area 1, openland and wetland wildlife habitat, is in general soil map units 1, 2, 3, and 4. Most of this area is used for cropland and pasture. A small portion is used for rangeland. The soils are nearly level and very poorly drained to moderately well drained. They are on flood plains, low terraces, and alluvial fans of Carson Valley and Antelope Valley. This area is suited to a wide variety of wildlife because of phreatophytes, riparian vegetation, and other lush plant growth adjacent to irrigation water delivery systems.

General soil map units 3 and 4 support the main wildlife species, which include mourning dove, ring-necked pheasant, cottontail rabbit, jackrabbit, muskrat, beaver, raptors, and small birds. Units 1 and 2 support a variety of wading birds. Ducks and geese migrate through this area during spring and fall, and a small population of ducks stays year round. Trout and catfish are in main streams of the East and West fork of the Carson River and West Walker River.

Urbanization has caused a deterioration of the habitats through change of drainage and irrigation patterns and loss of vegetation along fences and irrigation ditches.

Wildlife Area 2, nonirrigated, is the more gradual sloping part of the rangeland wildlife habitat. It includes general soil map units 5, 6, and 7. The soils vary from nearly level to strongly sloping and are on alluvial fans and terraces. The availability of food and cover depends on the erratic precipitation during winter and early in spring. Wildlife species include cottontail rabbit, jackrabbit, mourning dove, chuckar partridge, coyote, and migrating mule deer.

Much of the accelerating urban development is in this area. Migatory routes are being reduced and in some areas eliminated. Retention of these routes is essential to the preservation of the mule deer population.

Wildlife Area 3 includes general soil map units 8 and 10. It is the steeper, drier part of the rangeland wildlife habitat. The moderately steep to very steep soils are on low foothills. Precipitation comes mostly during winter when the plants are dormant. Because the vegetation production is low the population of wildlife is also low. Vegetation is mostly sagebrush and short grasses. The dominant wildlife is cottontail, jackrabbit, chuckar partridge, and small birds. This area is used sparingly as a winter range by mule deer.

Wildlife Area 4 includes general soil map units 9, 11, 12, and 13. It is the drier part of the woodland wildlife habitat. The soils are moderately steep to very steep. They are on mountain foothills and high terraces in the Pine Nut Mountains and Wellington hills. At lower elevations most of this area supports a dense stand of pinyon and juniper trees. The understory vegetation is sagebrush, bitterbrush, short grasses, and currant. At higher elevations this area does not support pinyon and juniper trees but supports sagebrush, bitterbrush, brome, and needlegrass.

This area is the main winter habitat for mule deer. However, some deer remain in the area throughout the year. Other wildlife species are chuckar partridge, cottontail rabbit, jackrabbit, a small number of sage grouse, and a few mountain lion.

Proper grazing management of livestock and wild horses would enhance the wildlife habitat elements.

Range forage allocation should include the wildlife indigenous to this area.

Wildlife Area 5 includes general soil map units 14, 15, and 16. It has more moisture than other parts of the woodland wildlife habitat. The area encompasses the east slopes of the Carson Range. The soils are moderately steep to very steep. The vegetation is pine and fir with a sparse understory of manzanita, sagebrush, bitterbrush, snowbush, bottlebrush, and needlegrass.

Wildlife indigenous to this area include mule deer, mountain quail, blue grouse, numerous rodents, and small birds. A small number of black bear, mountain lion, and wild turkey also inhabit this area.

Urban development along the crests is adversely affecting the local wildlife.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are Sandberg bluegrass, Indian ricegrass, and globemallow.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, fir, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, and cottontail.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a

landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and terraces and diversions.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments more than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Soil and Water Features

Tables 16 and 17 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups given in table 16 are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An

artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Table 17 gives estimates of bedrock, cemented pans, frost action, and corrosion. These estimates may be of value in land use planning and for engineering purposes.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*18*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Aridisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Orthid (*Orth*, meaning true, plus *id*, from Aridisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Camborthids (*Camb*, meaning change, plus *orthid*, the suborder of the Aridisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Camborthids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, mesic Typic Camborthids.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*17*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*18*). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Aldax Series

The Aldax series consists of shallow, well drained soils on foothills. These soils formed in the residuum of andesite or basalt. Permeability is moderately rapid. Slope ranges from 4 to 75 percent.

Typical pedon of Aldax stony fine sandy loam, 15 to 50 percent slopes; 1,000 feet east and 1,000 feet south of the northwest corner sec. 10, T. 11 N., R. 20 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) stony fine sandy loam, very dark brown (10YR 2/2) moist; weak medium and fine granular structure; soft,

friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 25 percent pebbles, 10 percent cobbles, 15 percent stones; neutral; clear wavy boundary.

A12—3 to 14 inches; brown (10YR 5/3) extremely stony fine sandy loam, dark brown (10YR 3/3) moist; weak fine and very fine granular structure; soft, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 30 percent pebbles, 20 percent cobbles, 25 percent stones; neutral; abrupt irregular boundary.

R—14 to 16 inches; extremely hard, undecomposed andesite.

The thickness of the solum and depth to hard andesite or basalt is 10 to 20 inches. Rock fragments are angular and range from 40 to 80 percent. Texture is fine sandy loam or loam. Structure is weak or moderate, very fine to medium, and granular or subangular blocky.

Borda Series

The Borda series consists of deep, well drained, slowly permeable soils on foothills. These soils formed in the residuum of andesitic tuff and tuff breccia. Slope ranges from 4 to 50 percent.

Typical pedon of Borda gravelly sandy loam, 4 to 15 percent slopes; about 2,200 feet south and 200 feet west of the northeast corner sec. 15, T. 11 N., R. 20 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium platy structure; soft, friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

A12—3 to 10 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 4/3) moist; weak fine granular structure; hard, friable, nonsticky and slightly plastic; few fine and many very fine roots; many very fine interstitial and tubular pores; slightly acid; abrupt wavy boundary.

B2t—10 to 24 inches; brown (7.5YR 5/4) clay, brown (7.5YR 5/4) moist; strong medium prismatic structure; extremely hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; continuous thick clay films lining pores and as bridges; many slickensides; neutral; clear wavy boundary.

B3tca—24 to 34 inches; brown (7.5YR 5/4) clay, brown (7.5YR 5/4) moist; few to common fine to medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine interstitial and tubular pores; many moderately thick clay films on ped faces and lining pores; noneffervescent matrix, violently effervescent; common fine and medium white (10YR 8/2) soft masses of lime on ped surfaces and rock fragments; moderately alkaline; gradual smooth boundary.

Cca—34 to 50 inches; variegated, 40 percent very pale brown (10YR 7/3), 40 percent light yellowish brown (10YR 6/4), and 20 percent strong brown (7.5YR 5/8) clay loam, yellowish brown (10YR 5/4, 10YR 5/6, 7.5YR 5/8) moist; massive; hard, friable, sticky and plastic; few very fine roots; few very fine tubular and many very fine interstitial pores; intermittently effervescent; few fine soft lime nodules in pockets and cracks; moderately alkaline; abrupt wavy boundary.

R—50 inches; andesite tuff bedrock.

The thickness of the solum ranges from 30 to 45 inches, and the depth to bedrock ranges from 40 to 60 inches.

Borda Variant

The Borda Variant consists of very deep, well drained, slowly permeable soils on mountain slopes and pediments. These soils formed in alluvium and colluvium derived from old alluvium. Slope ranges from 8 to 50 percent.

Typical pedon of Borda Variant very gravelly sandy loam, 15 to 30 percent slopes, in an area of Borda Variant-Glean-Chen association; 1,700 feet east and 700 feet north of the southwest corner sec. 36, T. 13 N., R. 22 E.

A11—0 to 3 inches; brown (10YR 5/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine and few fine and medium roots; 50 percent pebbles, 5 percent cobbles; neutral; abrupt wavy boundary.

A12—3 to 5 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 50 percent pebbles; neutral; abrupt wavy boundary.

B1t—5 to 12 inches; brown (10YR 5/3) extremely gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; many thin clay films coating ped faces and bridging sand grains; 60 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; abrupt irregular boundary.

B21t—12 to 16 inches; brown (10YR 5/3) very gravelly clay, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, very firm, very

sticky and very plastic; many very fine roots; many very fine tubular pores; many thin clay films coating ped faces and bridging sand grains; 50 percent pebbles, 5 percent cobbles; 5 percent stones; neutral; clear wavy boundary.

B22t—16 to 37 inches; brown (10YR 5/2) very gravelly clay, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; hard, very firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; common moderate thick pressure cutans; 40 percent pebbles; neutral; gradual wavy boundary.

B3t—37 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, sticky and plastic; 65 percent pebbles; neutral.

The B2t horizon is dominantly very gravelly clay or very gravelly sandy clay; however, in the lower subhorizon of some pedons, sandy clay loam is common.

Brockliss Series

The Brockliss series consists of very deep, somewhat poorly drained, rapidly permeable soils on alluvial fans and old flood plains. These soils formed in mixed alluvium that is mostly weathered from granitic sources but includes some volcanic flow rocks. Slope is 0 to 8 percent.

Typical pedon of Brockliss stony loamy sand, 0 to 8 percent slopes; about 50 feet east and 1,370 feet north of the southwest corner sec. 32, T. 12 N., R. 20 E.

A11—0 to 9 inches; dark grayish brown (10YR 4/2) stony loamy sand, very dark brown (10YR 2/2) moist; weak medium and fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 25 percent stones and cobbles; slightly acid; gradual smooth boundary.

A12—9 to 15 inches; dark brown (10YR 4/3) stony loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium to fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and few fine tubular pores; 25 percent stones and cobbles; slightly acid; gradual smooth boundary.

AC—15 to 23 inches; brown (10YR 5/3) very stony loamy sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many fine tubular pores; 45 percent stones and cobbles; slightly acid; gradual irregular boundary.

C—23 to 60 inches; lithocromic white (10YR 8/2), pale brown (10YR 6/3), and light yellowish brown (10YR 6/4) very stony coarse sand, dark grayish brown (10YR 4/2), light brown (10YR 5/4), and olive brown (2.5Y 4/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 45 percent stones and cobbles; slightly acid.

The particle size control section has 35 to 70 percent rock fragments of which half or more are stones and cobbles. Stones, cobbles, or gravel may be dominant in any one horizon within the profile.

The C horizon in some pedons has few to common, fine to coarse, iron mottles.

Brockliss Variant

The Brockliss Variant consists of very deep, somewhat poorly drained, moderately permeable soils on alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Slope is 4 to 8 percent.

Typical pedon of Brockliss Variant very gravelly loam, drained, 4 to 8 percent slopes, in an area of Brockliss Variant-Dangberg association; 1,000 feet east and 100 feet north of the southwest corner sec. 29, 14 N., R. 23 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very gravelly loamy sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; 45 percent pebbles; neutral; abrupt smooth boundary.

A12—2 to 6 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; 50 percent pebbles; neutral; clear smooth boundary.

A13—6 to 16 inches; dark grayish brown (10YR 4/2) extremely gravelly loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and few medium roots; many very fine and few fine tubular pores; 50 percent pebbles, 10 percent cobbles; neutral; clear smooth boundary.

A14—16 to 32 inches; dark grayish brown (10YR 4/2) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and moderate subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and few medium roots; common very fine and few fine tubular pores; 50 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

C1—32 to 43 inches; brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 3/3) moist; common fine faint iron mottles; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; common very fine and few fine tubular pores;

50 percent pebbles, 10 percent cobbles; mildly alkaline; abrupt smooth boundary.

C2—43 to 45 inches; grayish brown (2.5Y 5/2) very gravelly fine sandy loam, olive brown (2.5Y 4/4) moist; common distinct medium light olive brown (2.5Y 5/4), light olive brown (2.5YR 4/4), and greenish gray (5GY 6/1, 5GY 5/1) moist mottles; massive; hard, very friable, nonsticky and slightly plastic; 50 percent pebbles; mildly alkaline; abrupt smooth boundary.

C3—45 to 60 inches; pale olive (5Y 6/3) very gravelly very fine sandy loam, olive (5Y 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 40 percent pebbles; mildly alkaline.

Thickness of the mollic epipedon ranges from 24 to 36 inches. Mottles are common below a depth of 14 inches. The seasonal high water table ranges from 3.5 to 6 feet.

In the C horizon rock fragments, mainly pebbles, range from 40 to 65 percent.

Burnborough Series

The Burnborough series consists of deep and very deep, well drained, moderately permeable soils on mountain slopes. These soils formed in residuum and colluvium weathered from metavolcanic and andesite rock with interbedded sediment. Slope ranges from 30 to 75 percent.

Typical pedon of Burnborough very stony loam, 50 to 75 percent slopes, in an area of Burnborough-Pernty-Glean association; 1,050 feet west and 260 feet south of the northeast corner sec. 13, T. 10 N., R. 22 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; loose, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 40 percent pebbles, 5 percent stones; neutral; clear smooth boundary.

A12—3 to 10 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine medium and coarse roots; common very fine and few fine tubular pores; 40 percent pebbles; neutral; clear smooth boundary.

B1t—10 to 18 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky and plastic; common very fine to coarse roots; common very fine tubular pores; common thin clay films coating sand grains and on ped faces; 40 percent pebbles; neutral; clear smooth boundary.

B21t—18 to 27 inches; pale brown (10YR 6/3) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium angular blocky structure; hard, friable, sticky and plastic; common very fine and few fine and medium roots; many very fine tubular pores; common thin clay films coating sand grains, few thin clay films on ped faces; 35 percent pebbles, 15 percent cobbles; neutral; clear wavy boundary.

B22t—27 to 39 inches; brown (10YR 5/3) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium angular blocky structure; hard, very friable, very sticky and very plastic; common very fine and few fine and medium roots; few very fine tubular pores; continuous thin clay films on ped faces; 35 percent pebbles, 15 percent cobbles; neutral; clear irregular boundary.

B23t—39 to 54 inches; brown (10YR 5/3) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium angular blocky structure; hard, very friable, very sticky and very plastic; few very fine, fine and coarse roots; common very fine tubular pores; continuous moderately thick clay films on ped faces; 40 percent pebbles, 20 percent cobbles; neutral; clear wavy boundary.

B3t—54 to 60 inches; yellowish (10YR 5/4) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, sticky and plastic; few very fine roots; common very fine tubular pores; few clay films bridging sand grains and lining pores; 50 percent pebbles, 25 percent cobbles; neutral.

The thickness of the mollic epipedon is 10 to 20 inches. The solum thickness and depth to bedrock ranges from 40 to 80 inches. The particle size control section has 20 to 35 percent clay and averages 40 to 60 percent pebbles and cobbles.

The C horizon in some pedons is very gravelly fine sandy loam below a depth of 40 inches.

Burnborough Variant

The Burnborough Variant consists of moderately deep, well drained soils on mountain tops and side slopes. These soils formed in the residuum of conglomerate, andesite, and metavolcanic rock. Permeability is moderately slow. Slope ranges from 2 to 30 percent.

Typical pedon of Burnborough Variant stony loam, 4 to 15 percent slopes, in an area of Pernty-Burnborough Variant-Chen association; 3,700 feet west and 2,200 feet north of the southeast corner sec. 24, T. 10 N., R. 21 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) stony loam, black (10YR 2/1) moist; strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; 20 percent pebbles, 2 percent stones; medium acid; abrupt smooth boundary.

A12—1 to 3 inches; dark grayish brown (10YR 4/2) loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 10 percent pebbles; slightly acid; abrupt smooth boundary.
A13—3 to 8 inches; dark grayish brown (10YR 4/2) loam, black (10YR 2/1) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 10 percent pebbles; slightly acid; clear smooth boundary.
A14—8 to 19 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure parting to very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent pebbles; neutral; clear smooth boundary.
B2t—19 to 35 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; hard, friable, sticky and plastic; 20 percent pebbles; many thin clay films on ped faces, lining pores, and coating sand grains; neutral; abrupt smooth boundary.
Cr—35 inches; weathered and weakly fractured conglomerate bedrock; very thick clay films on fracture planes.

The thickness of the mollic epipedon is 20 to 30 inches. The solum thickness and depth to soft bedrock ranges from about 25 to 40 inches.

The A horizon is covered with 0.1 to 15 percent stones. The B2t horizon is gravelly clay loam or gravelly loam.

Cagle Series

The Cagle series consists of moderately deep, well drained, slowly permeable soils on mountain slopes. These soils formed in residuum and colluvium weathered from andesite. Slope ranges from 15 to 50 percent.

Typical pedon of Cagle very stony loam, 15 to 50 percent slopes, in an area of Cagle-Nosrac association; 2,000 feet east and 2,000 feet north of the southwest corner sec. 4, T. 11 N., R. 21 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and few fine and medium tubular pores; 30 percent pebbles, 20 percent stones; mildly alkaline; abrupt smooth boundary.
A12—1 to 4 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; 35 percent cobbles; mildly alkaline; abrupt smooth boundary.
B21t—4 to 12 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine common medium and few coarse roots; common very fine and few fine tubular pores; continuous thin clay films coating ped faces and lining pores; 20 percent pebbles, 10 percent cobbles; mildly alkaline; abrupt smooth boundary.
B22t—12 to 24 inches; brown (10YR 5/3) gravelly clay, dark grayish brown (10YR 4/3) moist; strong medium and coarse prismatic structure; hard, firm, very sticky and very plastic; few very fine to medium roots; few very fine tubular pores; continuous thick clay films on ped faces and lining pores; 20 percent pebbles; mildly alkaline; clear smooth boundary.
B23t—24 to 28 inches; grayish brown (10YR 5/2) gravelly clay, olive brown (2.5Y 4/4) moist; strong medium and coarse prismatic structure; hard, firm, very sticky and very plastic; few very fine and fine roots; common very fine tubular pores; continuous moderately thick clay films on ped faces and lining pores; 20 percent pebbles; mildly alkaline; abrupt smooth boundary.
Cr—28 to 35 inches; weathered andesite; clay films coat weak fracture planes.

The thickness of the mollic epipedon is 7 to 18 inches. The solum thickness and depth to paralithic contact ranges from 20 to 40 inches.

The B2t horizon is 20 to 35 percent rock fragments, mainly pebbles.

Cassiro Series

The Cassiro series consists of very deep, well drained soils on terrace side slopes. These soils formed in mixed alluvium. Permeability is moderately slow. Slope ranges from 15 to 50 percent.

Typical pedon of Cassiro extremely stony loam, 15 to 30 percent slopes, in an area of Indian Creek-Reno-Cassiro association; 1,600 feet west and 1,320 feet north of the southeast corner sec. 6, T. 11 N., R. 21 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) extremely stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; loose, nonsticky and nonplastic; 45 percent stones and cobbles, 20 percent pebbles; slightly acid; abrupt wavy boundary.
A12—2 to 5 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; strong very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores;

25 percent cobbles, 25 percent pebbles; neutral; abrupt wavy boundary.

Blt—5 to 11 inches; grayish brown (10YR 5/2) extremely gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong very fine angular blocky structure; slightly hard, very friable, sticky and plastic; common very fine to medium roots; many very fine tubular pores; common thin clay films on ped faces and lining pores; 15 percent cobbles, 45 percent pebbles; neutral; abrupt wavy boundary.

B21t—11 to 26 inches; dark brown (10YR 4/3) very gravelly clay, dark brown (10YR 3/3) moist; strong fine and very fine angular blocky structure; very hard, firm, very sticky and very plastic; common very fine and fine roots; few very fine tubular pores; continuous moderately thick clay films on ped faces and lining pores; 10 percent cobbles, 50 percent pebbles; neutral; clear wavy boundary.

B22t—26 to 35 inches; yellowish brown (10YR 5/4) very gravelly clay, dark yellowish brown (10YR 4/4) moist; strong fine and very fine angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; continuous thin clay films on ped faces and lining pores; 5 percent cobbles, 50 percent pebbles; neutral; abrupt wavy boundary.

B3t—35 to 41 inches; light gray (10YR 7/1) gravelly sandy clay loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; few very fine tubular pores; common thin clay films lining pores; 5 percent cobbles, 10 percent pebbles; neutral; abrupt wavy boundary.

C—41 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 5 percent cobbles, 10 percent pebbles; mildly alkaline.

The thickness of the mollic epipedon is 10 to 16 inches. The thickness of the solum ranges from 40 to 50 inches.

The B2t horizon is clay and is 40 to 60 percent rock fragments.

Chalco Series

The Chalco series consists of shallow, well drained, very slowly permeable soils on terrace side slopes. These soils formed in the residuum of lake-laid tuffs and mudstone. Slope ranges from 8 to 50 percent.

Typical pedon of Chalco very cobbly loam, 15 to 30 percent slopes, eroded, in an area of Chalco complex, 8 to 30 percent slopes; about 300 feet south and 500 feet east of the northwest corner sec. 9, T. 13 N., R. 21 E.

A1t—0 to 1 inch; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; fine granular structure; soft, slightly hard, slightly sticky and slightly plastic; many very fine interstitial pores; 50 percent pebbles and cobbles; mildly alkaline; abrupt smooth boundary.

B21t—1 to 2 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong medium prismatic structure; slightly hard, very friable, sticky and plastic; few very fine roots; few very fine tubular and interstitial pores; few thin clay films coating sand grains; mildly alkaline; abrupt smooth boundary.

B22t—2 to 11 inches; pale brown (10YR 6/3) clay, very dark grayish brown (10YR 3/2) moist; strong medium prismatic structure; hard, friable, very sticky and plastic; few very fine and fine roots; few very fine tubular pores; continuous clay films on ped faces; mildly alkaline; abrupt smooth boundary.

IIC1—11 to 14 inches; light yellowish brown gray (2.5Y 6/4) clay, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, very sticky and very plastic; few medium roots; common very fine and few fine tubular pores; continuous thin clay films lining pores; mildly alkaline; abrupt irregular boundary.

IIC2r—14 to 25 inches; light gray (10YR 7/2) weathered mudstone; lime coating in fractures.

The thickness of the solum and depth to paralithic contact is 10 to 20 inches.

The A horizon has platy, blocky, or granular structure. The B2t horizon has 40 to 50 percent clay.

Chen Series

The Chen series consists of shallow, well drained, very slowly permeable soils on mountain ridges. These soils formed in the residuum of andesite. Slope ranges from 2 to 30 percent.

Typical pedon of Chen very cobbly loam, 2 to 8 percent slopes, in an area of Pernty-Burnborough Variant-Chen association; 100 feet north and 100 feet east of the southwest corner sec. 13, T. 10 N., R. 21 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; strong coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores; 40 percent pebbles, 25 percent cobbles; slightly acid; abrupt smooth boundary.

A12—2 to 5 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 50 percent pebbles; neutral; clear wavy boundary.

B21t—5 to 9 inches; brown (10YR 5/3) extremely gravelly clay, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; many moderately thick clay films on ped faces; 60 percent pebbles; neutral; abrupt wavy boundary.

B22t—9 to 14 inches; brown (10YR 5/3) extremely gravelly clay, very dark grayish brown (10YR 3/2) moist; moderate fine angular blocky structure; hard, friable, very sticky and very plastic; common very fine and few fine roots; common very fine tubular pores; continuous moderately thick clay films on ped faces; 75 percent pebbles; neutral; abrupt irregular boundary.

R—14 inches; unweathered andesite.

The mollic epipedon generally includes the upper part of the argillic horizon. It is 10 to 14 inches thick. Thickness of the solum and depth to bedrock ranges from 12 to 20 inches.

The B2t horizon is 40 to 75 percent rock fragments.

Corbett Series

The Corbett series consists of moderately deep, somewhat excessively drained, rapidly permeable soils on mountain side slopes. These soils formed in residuum and colluvium weathered from granite. Slope ranges from 4 to 50 percent.

Typical pedon of Corbett gravelly sand, 15 to 30 percent slopes; 500 feet east and 1,000 feet north of the southwest corner sec. 16, T. 13 N., R. 19 E.

O1—2 inches to 0; pine needles.

A1—0 to 3 inches; grayish brown (10YR 5/2) gravelly sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and fine interstitial pores; 25 percent pebbles; medium acid; clear wavy boundary.

C1—3 to 9 inches; pale brown (10YR 6/3) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine and fine interstitial pores; 25 percent pebbles; slightly acid; clear wavy boundary.

C2—9 to 16 inches; pale brown (10YR 6/3) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and medium and few coarse roots; many very fine and fine interstitial pores; 25 percent pebbles; medium acid; clear wavy boundary.

C3—16 to 24 inches; pale brown (10YR 6/3) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine few medium and coarse roots; many very fine and fine interstitial pores; 25 percent pebbles; medium acid; abrupt irregular boundary.

C4r—24 inches; weathered granite.

The depth to the paralithic contact is 24 to 40 inches.

The C horizon is gravelly loamy coarse sand or gravelly loamy sand and is 15 to 35 percent pebbles.

Cradlebaugh Series

The Cradlebaugh series consists of very deep, poorly drained soils on flood plains. These soils formed in the residuum of primary granitic rock with mixtures or gneiss, slate, andesite, basalt, and volcanic ash. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical pedon of Cradlebaugh clay loam, drained, slightly saline-alkali; about 1,000 feet north and 25 feet east of the center sec. 2, T. 12 N., R. 19 E.

Ap—0 to 4 inches; gray (10YR 5/1) clay loam, very dark brown (10YR 2/2) moist; moderate fine granular structure in the uppermost 2 inches and massive below; very hard, friable, sticky and plastic; many very fine and fine roots; many very fine tubular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

A1—4 to 9 inches; gray (10YR 5/1) clay loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; many very fine and few medium tubular pores; strongly effervescent; strongly alkaline; clear wavy boundary.

AC—9 to 17 inches; gray (2.5Y 5/1) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; few fine faint dark gray (10YR 4/1) moist mottles; weak coarse prismatic structure; hard, friable, sticky and plastic; many very fine and few fine roots; many very fine and fine tubular and interstitial pores; few thin clay films on ped faces and in pores; common fine and medium soft masses and filaments of lime in root channels; strongly effervescent; strongly alkaline; clear wavy boundary.

C1si—17 to 27 inches; light gray (2.5Y 6/1) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; common fine and medium faint very dark grayish brown (2.5Y 3/2) organic stains; massive; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; discontinuous weak silica cementation; common fine soft lime masses; strongly effervescent; strongly alkaline; clear wavy boundary.

C2—27 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; weak fine angular and subangular blocky structure; hard, friable, sticky and plastic; many very fine and

fine roots; many very fine and fine tubular pores; strongly alkaline; clear smooth boundary.

C3g—32 to 39 inches; grayish brown (2.5Y 5/2) slightly micaceous sandy clay loam, olive gray (5Y 4/2) moist; massive; hard, friable, sticky and plastic; common very fine and fine roots; common very fine and fine and few coarse tubular pores; moderately alkaline; clear wavy boundary.

C4g—39 to 55 inches; light olive gray (5Y 6/2) slightly micaceous fine sandy loam, olive gray (5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; moderately alkaline; clear wavy boundary.

C5gsi—55 to 65 inches; light olive gray (5Y 6/2) slightly micaceous fine sandy loam, variegated dark gray (N 4/), olive gray (5Y 4/2), and olive (5Y 4/3) moist; common medium and large prominent dark reddish brown (5YR 3/4) mottles; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; about 10 to 15 percent brittle, silica-cemented fragments 1/4 to 1 inch in diameter; moderately alkaline.

Generally, the depth to discontinuous, weak silica cementation is 17 to 30 inches; it is less where leveling cuts have been made. Silica-cemented fragments in the Csi horizon commonly range from 20 to 40 percent but are as much as 90 percent in some pedons.

The C horizon is stratified silty clay loam, clay loam, sandy clay loam, loam, very fine sandy loam, or fine sandy loam. Mottles are few to common and distinct or prominent. Strata of gravel or sand are below a depth of 48 inches in some pedons.

Dangberg Series

The Dangberg series consists of moderately deep, poorly drained, very slowly permeable soils on low lying alluvial terraces. These soils formed from mixed alluvium. Slope is 0 to 2 percent.

Typical pedon of Dangberg clay, slightly saline-alkali; about 600 feet south and 800 feet east of the north quarter corner sec. 19, T. 13 N., R. 20 E.

A1—0 to 3 inches; gray (10YR 5/1) clay, very dark brown (10YR 2/2) moist; moderate medium and coarse subangular blocky structure; extremely hard, firm, very sticky and very plastic; many very fine and fine roots; common very fine and fine interstitial pores; strongly alkaline; abrupt wavy boundary.

B21t—3 to 15 inches; light brownish gray (10YR 6/2) clay, dark grayish brown (2.5Y 4/2) moist; weak very coarse prismatic structure; very hard, friable, very sticky and very plastic; many very fine and few fine roots; many thin clay films on faces of peds, lining pores, and bridging mineral grains; slightly effervescent matrix with strongly effervescent common fine distinct soft masses of lime; strongly alkaline; abrupt wavy boundary.

B22t—15 to 25 inches; light brownish gray (10YR 6/2) sandy clay, dark brown (10YR 3/3) moist; few fine and medium distinct dark brown (7.5YR 3/2) iron mottles, dark brown (7.5YR 3/2) moist; massive; very hard, friable, very sticky and very plastic; few very fine roots; few very fine tubular and many macro interstitial pores; thin continuous clay films lining pores, common thin clay films on ped faces; slightly effervescent matrix with violently effervescent common fine and medium soft masses of lime; strongly alkaline; gradual wavy boundary.

C1sim—25 to 43 inches; light brownish gray (10YR 6/2) strongly cemented duripan, dark brown (10YR 3/3) moist; common medium distinct dark brown (5YR 3/3) iron mottles, dark brown (7.5YR 3/2) moist; weak medium and thick platy structure; very hard, very firm, brittle; few fine horizontal roots between plates; many very fine interstitial pores; slightly effervescent matrix with violently effervescent common fine to large soft masses of lime and few fine nodules; moderately alkaline; abrupt smooth boundary.

IIC2—43 to 60 inches; pale brown (10YR 6/3) coarse sand, brown (10YR 4/3) moist; many dark gray (7.5YR 3/2) iron mottles, yellowish red (5Y 5/6) and reddish brown (5YR 4/3) moist; single grain; many very fine and fine interstitial pores; slightly effervescent; moderately alkaline.

The thickness of the solum and depth to the strongly cemented duripan is 24 to 33 inches. The duripan commonly has platy structure but is massive in some pedons.

The A1 horizon is calcareous in some pedons. The B2t horizon is clay loam, sandy clay, or clay and is 35 to 50 percent clay. The exchangeable sodium is 15 to 30 percent.

Devada Series

The Devada series consists of shallow, well drained, slowly permeable soils on hills and mountain slopes. These soils formed in the residuum of andesite and rhyolite. Slope ranges from 8 to 50 percent.

Typical pedon of Devada very cobbly loam, 15 to 30 percent slopes, in an area of Devada-Koontz association; about 20 miles southeast of Minden, 2,000 feet east and 1,000 feet north of the southwest corner sec. 20, T. 10 N., R. 22 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores;

30 percent pebbles, 20 percent cobbles; slightly acid; abrupt smooth boundary.

A12—1 inch to 4 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; 30 percent pebbles, 20 percent cobbles; slightly acid; abrupt smooth boundary.

B21t—4 to 5 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, sticky and plastic; few fine roots; very few fine tubular pores; continuous clay films on ped faces; neutral; abrupt smooth boundary.

B22t—5 to 13 inches; dark brown (10YR 4/3) gravelly clay, dark brown (10YR 3/3) moist; strong medium and coarse angular blocky structure; hard, firm, very sticky and very plastic; few fine roots; few fine tubular pores; continuous moderately thick clay films on ped faces and lining pores; 15 percent pebbles; neutral; very abrupt irregular boundary.

R—13 inches; rhyolite bedrock.

The thickness of the mollic epipedon is 7 to 20 inches. The solum thickness and depth to the lithic contact is 12 to 20 inches.

The A horizon is platy, subangular blocky, or massive. The B2t horizon is dominantly clay or gravelly clay, but thin subhorizons are commonly clay loam. Rock fragments, mainly pebbles, range from 0 to 30 percent.

Deven Series

The Deven series consists of shallow, well drained, slowly permeable soils on hills and mountain slopes. These soils formed in the residuum of andesite. Slope ranges from 8 to 50 percent.

Typical pedon of Deven very stony loam, 15 to 30 percent slopes, in an area of Cagle-Deven-Nosrac association; about 500 feet west and 1,000 feet north of the southeast corner sec. 14, T. 11 N., R. 21 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very stony loam, very dark brown (10YR 2/2) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 15 percent stones; neutral; abrupt smooth boundary.

A12—1 to 2 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; strong medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine vesicular pores; 25 percent pebbles; neutral; clear smooth boundary.

B1t—2 to 6 inches; dark brown (7.5YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; common very fine to medium and few coarse roots; common very fine tubular pores; 5 percent pebbles; continuous thin clay films coating ped faces and lining pores; neutral; abrupt smooth boundary.

B21t—6 to 8 inches; brown (7.5YR 4/2) clay, dark brown (10YR 3/3) moist; strong medium angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; 5 percent pebbles; continuous moderately thick clay films coating ped faces and lining pores; neutral; abrupt smooth boundary.

B22t—8 to 15 inches; brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine and medium roots; few very fine and fine tubular pores; 5 percent pebbles; continuous moderately thick clay films on ped faces and lining pores; neutral; abrupt irregular boundary.

B23t—15 to 17 inches; reddish brown (5YR 4/3) extremely cobbly clay, dark reddish brown (5YR 3/4) moist; strong medium and coarse angular blocky structure; very hard, firm, very sticky and very plastic; few very fine tubular pores; 60 percent cobbles; continuous thin clay films on ped faces and coating rock fragment surfaces; neutral; very abrupt irregular boundary.

R—17 inches; andesitic bedrock.

Depth to lithic contact is 12 to 20 inches.

The B2t horizon averages 0 to 15 percent rock fragments. A subhorizon in the lower part of the B2 horizon may be as much as 65 percent rock fragments.

Dressler Series

The Dressler series consists of very deep, somewhat poorly drained soils on alluvial fans and terraces. These soils formed in mixed alluvium but primarily in alluvium weathered from granitic rock. Permeability is moderately rapid. Slope is 0 to 2 percent.

Typical pedon of Dressler coarse sandy loam; about 100 feet south and 1,500 feet west of the center sec. 29, T. 12 N., R. 20 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and tubular pores; 10 percent pebbles; slightly acid; abrupt smooth boundary.

A12—6 to 20 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine

interstitial and tubular pores; 10 percent fine pebbles; neutral; abrupt wavy boundary.

AC—20 to 37 inches; yellowish brown (10YR 5/4) loamy coarse sand, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many fine and very fine tubular pores; 5 percent pebbles; neutral; abrupt wavy boundary.

C1—37 to 49 inches; brown (10YR 5/3) cobbly coarse sandy loam, brown (10YR 4/3) moist; many medium prominent mottles of strong brown (7.5YR 5/6) and brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine and fine interstitial and tubular pores; 25 percent cobbles and stones; slightly acid; abrupt irregular boundary.

C2—49 to 60 inches; about 60 percent pale brown (10YR 6/3) and 40 percent strong brown (7.5YR 5/6) loamy sand, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many fine and very fine interstitial pores; slightly acid.

The thickness of the mollic epipedon is 12 to 20 inches. Rock fragments average 5 to 35 percent throughout the profile; any single horizon, however, may be as much as 50 percent rock fragments, mainly pebbles, some cobbles, and occasional stones.

The A horizon has granular or subangular blocky structure or is massive or single grain. The C horizon is dominantly sandy loam or coarse sandy loam, loamy sand, or loamy coarse sand. It has thin strata of sand to sandy clay loam in some pedons.

Drit Series

The Drit series consists of very deep, well drained soils on mountain slopes. These soils formed in colluvium weathered from granitic and metavolcanic rocks. Permeability is moderately rapid. Slope ranges from 15 to 75 percent.

Typical pedon of Drit coarse sandy loam, 15 to 50 percent slopes, in an area of Trid-Roloc-Drit association; 1,700 feet west and 2,000 feet south of the northeast corner sec. 19, T. 14 N., R. 23 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine interstitial pores; 20 percent pebbles 2 millimeters to 1/4 inch in diameter and 5 percent 1/4 inch to 2 inches in diameter; slightly acid; abrupt smooth boundary.

A12—2 to 8 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine and few fine tubular pores; 5 percent pebbles 2 millimeters to 1/4 inch in diameter and 5 percent 1/4 inch to 2 inches in diameter; neutral; clear smooth boundary.

A13— 8 to 15 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; common medium and coarse subangular blocky structure; slightly hard, very friable; nonsticky and nonplastic; common very fine to medium roots; few very fine and fine tubular pores; many black (10YR 2/1) organic stains coating sand grains; 10 percent pebbles 2 millimeters to 1/4 inch in diameter and 5 percent 1/4 inch to 2 inches in diameter; neutral; clear smooth boundary.

A14—15 to 28 inches; brown (10YR 5/3) very gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine to coarse roots; many very fine tubular pores; 10 percent pebbles 2 millimeters to 1/4 inch in diameter, 25 percent pebbles 1/4 inch to 3 inches in diameter, 10 percent cobbles and stones; few thin organic stains coating sand grains; neutral; clear smooth boundary.

B2—28 to 38 inches; yellowish brown (10YR 5/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 10 percent pebbles 2 millimeters to 1/4 inch in diameter, 20 percent pebbles 1/4 inch to 3 inches in diameter, 15 percent cobbles and stones; few thin organic stains coating sand grains; neutral; clear smooth boundary.

C—38 to 60 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 20 percent pebbles, 2 millimeters to 1/4 inch in diameter and 25 percent pebbles 1/4 inch to 3 inches in diameter; neutral.

The thickness of the mollic epipedon is 20 to 38 inches. The solum thickness is 28 to 41 inches. Rock fragments range from 40 to 75 percent, mainly pebbles and 5 to 35 percent cobbles or stones in any one horizon. The particle size control section is very gravelly or extremely gravelly coarse sandy loam, sandy loam, or fine sandy loam.

Duco Series

The Duco series consists of shallow, well drained soils on mountain ridges and side slopes. These soils formed in the residuum of andesite and metasedimentary and metavolcanic rock. Permeability is moderately slow. Slope ranges from 8 to 50 percent.

Typical pedon of Duco extremely stony loam, 15 to 30 percent slopes, in an area of Duco-Cagle-Nosrac association; 1,500 feet west and 1,806 feet south of the northeast corner sec. 7, T. 11 N., R. 20 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) extremely stony loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine vesicular and few fine tubular pores; 45 percent stones; neutral; abrupt smooth boundary.

A12—2 to 5 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium and coarse roots; many very fine tubular pores; 20 percent pebbles, 5 percent stones; neutral; abrupt wavy boundary.

B1t—5 to 10 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 2/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; common very fine tubular pores; few thin clay films coating and bridging sand grains; 20 percent pebbles; neutral; abrupt wavy boundary.

B2t—10 to 19 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common very fine to medium roots; many very fine tubular pores; many moderately thick clay films on ped faces; 40 percent pebbles, 10 percent cobbles; neutral; abrupt wavy boundary.

R—19 to 20 inches; hard fractured andesite; common moderately thick clay films on fracture planes. Few fine roots in fractures.

The thickness of the mollic epipedon is 7 to 20 inches. The solum thickness and depth to bedrock is 10 to 20 inches.

The Bt horizon averages 27 to 35 percent clay and is 35 to 75 percent rock fragments.

East Fork Series

The East Fork series consists of very deep, somewhat poorly drained soils on smooth low lying terraces. These soils formed in alluvium weathered from various sources of rock. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical pedon of East Fork clay loam; about 750 feet south and 400 feet east of the north quarter corner sec. 4, T. 12 N., R. 20 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; many very fine to medium roots; common very fine and fine tubular and many very fine and fine interstitial pores; numerous wormholes; neutral; clear smooth boundary.

A1—6 to 11 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong medium and fine subangular blocky structure; hard, friable, sticky and plastic; many very fine to medium roots; few very fine and fine tubular and many very fine and fine interstitial pores; neutral; gradual smooth boundary.

C1—11 to 30 inches; grayish brown (10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; few very fine tubular and many very fine interstitial pores; neutral; clear smooth boundary.

IIC2—30 to 45 inches; brown (10YR 5/3) loamy sand, dark grayish brown (10YR 4/2) moist; few very fine and medium distinct reddish brown (5YR 4/3) moist iron mottles; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; matrix mainly noneffervescent, but slightly effervescent in spots; neutral; abrupt smooth boundary.

IIIC3—45 to 63 inches; brown (10YR 5/3) heavy clay loam, dark grayish brown (10YR 4/2) moist; few to common fine and medium distinct brown (5YR 4/3) moist iron mottles; massive; very hard, friable, very sticky and plastic; common very fine interstitial pores; matrix noneffervescent; few medium distinct white (10YR 8/2) strongly effervescent lime filaments; neutral.

These soils are commonly noncalcareous, but some pedons have few to common, fine and medium lime segregations below a depth of 30 inches. The particle size control section is dominantly clay loam or sandy clay loam that is 25 to 35 percent clay and is normally stratified with thin strata of sand, loamy sand, sandy loam, or loam. In places, gravelly material underlies these soils below a depth of 42 inches.

The structure of the A horizon is moderate or strong, fine or medium, subangular blocky or granular, except it is weak or massive in the Ap horizon. The C horizon has reddish mottles with high chroma at a depth of 24 inches or below.

East Fork Variant

The East Fork Variant consists of very deep, somewhat poorly drained, moderately permeable soils on alluvial terraces and flood plains. These soils formed in the residuum of granite, other igneous rock, and sedimentary rock. Slope is 0 to 2 percent.

Typical pedon of East Fork Variant loam; 150 feet south and 1,840 feet east of the northwest corner sec. 4, T. 12 N., R. 20 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 3/2) moist; weak thick platy structure parting to moderate fine subangular and weak medium and fine granular; hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine interstitial pores; neutral; clear smooth boundary.

A11—8 to 15 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

A12—15 to 38 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine and fine tubular pores; slightly acid; clear wavy boundary.

C1—38 to 48 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; many fine to coarse faint very dark grayish brown (10YR 3/2) mottles; massive; slightly hard, friable, sticky and slightly plastic; common very fine and fine roots; few very fine and fine interstitial pores; neutral; abrupt smooth boundary.

IIC2—48 to 60 inches; brown (10YR 5/3) very gravelly sand, dark brown (10YR 3/3) moist; many fine and medium distinct reddish yellow (7.5YR 6/6) and yellowish red (5YR 5/6) mottles; single grain; loose, nonsticky and nonplastic; very few fine roots; many interstitial pores; neutral.

These soils are commonly noncalcareous throughout, but the fine textured strata may have a few lime segregations.

The C horizon is stratified loam, silt loam, clay loam, and sandy loam. The IIC horizon is very gravelly sand or very gravelly loamy sand.

Fettic Series

The Fettic series consists of very deep, somewhat poorly drained, very slowly permeable soils on low terraces. These soils formed in mixed alluvium. Slope is 0 to 2 percent.

Typical pedon of Fettic very fine sandy loam; 700 feet north and 300 feet east of the southwest corner sec. 19, T. 14 N., R. 20 E.

A1—0 to 4 inches; gray (10YR 5/1) very fine sandy loam, very dark gray (10YR 3/1) moist; massive; soft, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine vesicular pores; slightly effervescent; moderately alkaline; abrupt wavy boundary.

B2t—4 to 9 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium prismatic structure; hard, friable, very sticky and very plastic; common very fine and fine mostly exped roots; common very fine tubular pores; continuous moderately thick clay films on peds and lining pores; slightly effervescent; few medium strongly effervescent soft masses of lime; very strongly alkaline; clear wavy boundary.

B31t—9 to 21 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few medium prominent black (10YR 2/1) organic stains on peds; strong medium prismatic structure; hard, firm, sticky and very plastic; many very fine and fine roots; many very fine and fine tubular pores; continuous thin clay films on peds and lining pores; few medium strongly effervescent soft masses of lime; very strongly alkaline; gradual smooth boundary.

B32t—21 to 29 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few fine prominent dark reddish brown (2.5YR 3/4) iron mottles; moderate medium prismatic structure; hard, firm, sticky and plastic; many thin clay films on peds and lining pores; common very fine and fine tubular pores; strongly effervescent; common medium lime filaments; very strongly alkaline; clear smooth boundary.

C1—29 to 36 inches; grayish brown (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; few fine distinct dark brown (7.5YR 3/2) iron mottles; massive; hard, friable, slightly sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; few thin clay films in pores; slightly effervescent; moderately alkaline; clear smooth boundary.

C2—36 to 41 inches; grayish brown (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, friable, slightly sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; slightly effervescent; moderately alkaline; gradual smooth boundary.

IIC3—41 to 54 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; many medium and large distinct very dark gray (5YR 3/1) and many fine dark brown (7.5YR 3/2) mottles; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; moderately alkaline; gradual smooth boundary.

IIC4—54 to 62 inches; pale brown (10YR 6/3) loamy sand, dark gray (10YR 4/1) moist; many large prominent very dark grayish brown (10YR 3/2)

mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; moderately alkaline.

The thickness of the mollic epipedon ranges from 7 to 14 inches. The solum thickness ranges from 16 to 32 inches. The exchangeable sodium is 30 to 60 percent. The soil is saturated at a depth of 20 to 40 inches in spring and early in summer. Mottles are in some subhorizons.

The B2t horizon is clay loam or clay. The C horizon is stratified very fine sandy loam to fine sand. Unconformable gravel and sand are below a depth of 48 inches in some pedons.

Franktown Series

The Franktown series consists of shallow and very shallow, somewhat excessively drained soils on mountain side slopes. These soils formed in the residuum of metamorphic rock, such as schists, gneisses, and slates, and from metavolcanic rock. Permeability is moderately rapid. Slope ranges from 50 to 75 percent.

Typical pedon of Franktown very stony sandy loam, 50 to 75 percent slopes, in an area of Franktown-Rubble land-Rock outcrop complex, 50 to 75 percent slopes; about 1,000 feet east and 700 feet south of the northwest corner sec. 4, T. 13 N., R. 19 E.

O1—1/2 inch to 0; litter of pine needles.

A1—0 to 5 inches; olive gray (5Y 5/2) very stony sandy loam, dark olive gray (5Y 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 50 percent rock fragments, predominantly stones; medium acid; clear smooth boundary.

C—5 to 10 inches; light olive gray (5Y 6/2) extremely gravelly sandy loam, olive gray (5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; many very fine interstitial pores; about 60 percent pebbles and some stones and cobbles; medium acid; abrupt irregular boundary.

R—10 inches; unweathered gneiss bedrock.

The depth to bedrock ranges from 6 to 20 inches. Stones are mainly in the A1 horizon. The C horizon is dominantly sandy loam but is fine sandy loam or coarse sandy loam in some pedons. It is modified by rock fragments, dominantly 50 to 80 percent by volume pebbles or cobbles.

Gardnerville Series

The Gardnerville series consists of very deep, somewhat poorly drained, slowly permeable soils on smooth alluvial fans and terraces. These soils formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent.

Typical pedon of Gardnerville clay loam; about 900 feet south and 300 feet east of the center sec. 8, T. 13, N., R. 20 E.

A11—0 to 2 inches; gray (10YR 6/1) fine sandy loam, dark gray (10YR 4/1) moist; weak thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine and medium vesicular pores; slightly acid; abrupt wavy boundary.

A12—2 to 3 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; very hard, friable, sticky and plastic; common very fine and fine roots; few very fine interstitial and many very fine tubular pores; few thin clay films on ped faces and lining pores; neutral; abrupt broken boundary.

B21t—3 to 6 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong very fine subangular blocky; hard, friable, very sticky and very plastic; common very fine and few fine roots; many very fine interstitial and few very fine tubular pores; thin discontinuous clay films on ped faces and lining pores; neutral; abrupt smooth boundary.

B22t—6 to 8 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, firm, very sticky and very plastic; common very fine and few fine roots; few very fine tubular and common very fine and fine interstitial pores; neutral; clear wavy boundary.

B3t—8 to 16 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; few very fine and fine roots; few very fine interstitial tubular pores; common thin clay bridges between sand grains, common thin clay films lining pores; violently effervescent; white (10YR 8/2) lime mottles; mildly alkaline; clear wavy boundary.

C1si—16 to 35 inches; brown (10YR 5/3) weakly silica-cemented coarse sandy loam, dark brown (10YR 4/3) moist; few fine distinct dark brown (7.5YR 3/2) iron mottles; massive; hard, firm, brittle; few very fine roots; few fine and very fine interstitial pores; few thin silica bridges between sand grains; strongly effervescent white (10YR 8/2) lime mottles; noneffervescent; mildly alkaline; clear smooth boundary.

C2si—35 to 58 inches; brown and pale brown (10YR 5/3 and 6/3) weakly silica-cemented loamy coarse sand, dark brown and brown (10YR 3/3 and 4/3) moist; common medium and coarse distinct dark brown (7.5YR 3/2) iron mottles; massive; slightly hard,

friable, brittle; few very fine roots; few very fine and fine interstitial pores; mildly alkaline; clear smooth boundary.

IIC5—58 to 67 inches; yellow (10YR 7/6) coarse sand, yellowish brown (10YR 5/8) moist; common coarse prominent black (10YR 2/1) manganese mottles and common coarse distinct brown (7.5YR 4/3) iron mottles; single grain; loose dry or moist; many very fine interstitial pores; mildly alkaline.

The thickness of the solum ranges from 9 to 20 inches. In most pedons the lower part of the B horizon and the upper part of the C horizon are slightly calcareous.

The B horizon is clay or heavy clay loam. The Csi horizon is weakly silica cemented, and the subhorizons are 20 to 80 percent durinodes. In the lower part of the C horizon in some pedons, a thin layer of gravel is at a depth of 24 to 36 inches.

Genoa Series

The Genoa series consists of shallow, well drained soils on ridges and side slopes of mountains. These soils formed in the residuum of primarily granitic and metavolcanic rocks. Permeability is moderately slow. Slope ranges from 4 to 50 percent.

Typical pedon of Genoa extremely stony sandy loam, 15 to 30 percent slopes, in an area of Glean-Sup-Genoa association; 2,100 feet north of the south quarter corner sec. 22, T. 12 N., R. 22 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) extremely stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and many very fine tubular pores; 20 percent pebbles 2 millimeters in diameter and 30 percent 1/4 inch to 1 inch in diameter, 30 percent stones; slightly acid; abrupt smooth boundary.

B21t—2 to 6 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine tubular pores; many thin clay films on ped faces and lining pores; 20 percent pebbles 2 millimeters to 1/4 inch in diameter and 30 percent 1/4 to 1 inch in diameter; neutral; clear smooth boundary.

B22t—6 to 12 inches; brown (10YR 5/3) extremely cobbly sandy clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine tubular pores; continuous thin clay films on ped faces and lining pores; 10 percent pebbles 2 millimeters to 1/4 inch in diameter and 15 percent 1/4 inch to 2 inches diameter, 45 percent cobbles; neutral; clear wavy boundary.

B23t—12 to 19 inches; yellowish brown (10YR 5/4) extremely cobbly sandy clay loam, dark brown (10YR 3/4) moist; moderate fine to medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; continuous thin clay films on ped faces and lining pores; 5 percent pebbles 2 millimeters to 1/4 inch in diameter and 20 percent 1/4 inch to 2 inches diameter, 40 percent cobbles, 15 percent stones; neutral; abrupt irregular boundary.

R—19 to 23 inches; unweathered granite.

The thickness of the mollic epipedon is 10 to 14 inches. The solum thickness and depth to bedrock is 12 to 20 inches.

The B2t horizon is very cobbly sandy clay loam to extremely cobbly loam. The content of rock fragments ranges from 55 to 75 percent, mostly cobbles.

Glean Series

The Glean series consists of deep and very deep, well drained soils on mountain slopes. These soils formed in colluvium derived from mixed sources of rock. Permeability is moderately rapid. Slope ranges from 4 to 75 percent.

Typical pedon of Glean very stony sandy loam, 15 to 50 percent slopes, in an area of Glean-Sup-Genoa association; 800 feet north of the southwest corner of sec. 19, T. 10 N., R. 21 E.

O—1 inch to 0; decomposing organic matter.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark brown (10YR 2/2) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine tubular and interstitial pores; 30 percent pebbles, 5 percent cobbles, 25 percent stones; neutral; clear smooth boundary.

A12—2 to 14 inches; grayish brown (10YR 5/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; common very fine and few fine tubular pores; 40 percent pebbles, 15 percent cobbles, 1 percent stones; neutral; gradual smooth boundary.

A13—14 to 23 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine tubular pores; 40 percent pebbles, 15 percent cobbles, 1 percent stones; neutral; gradual smooth boundary.

C—23 to 60 inches; brown (10YR 5/3) very gravelly loam, very dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine tubular pores; 40 percent pebbles, 15 percent cobbles, 1 percent stones; neutral.

The depth of lithic contact is 40 to 70 inches. The particle size control section is sandy loam, fine sandy loam, or loam modified by 40 to 60 percent pebbles, cobbles, and stones.

Glenbrook Series

The Glenbrook series consists of shallow, somewhat excessively drained, rapidly permeable soils on uplands. These soils formed in the residuum of granite. Slope ranges from 8 to 50 percent.

Typical pedon of Glenbrook sand, 15 to 30 percent slopes, in an area of Glenbrook sands, 8 to 30 percent slopes; 650 feet south and 200 feet west of the center sec. 12, T. 14 N., R. 19 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine interstitial pores; 10 percent fine pebbles; slightly acid; abrupt wavy boundary.

A12—4 to 9 inches; grayish brown (10YR 5/2) fine gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine and few medium and coarse roots; many fine interstitial pores; 20 percent fine pebbles; slightly acid; clear smooth boundary.

C1—9 to 15 inches; light brownish gray (10YR 6/2) gravelly loamy coarse sand, brown (10YR 4/3) moist; weak medium coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and few medium and coarse roots; common fine and very fine interstitial pores; few thin clay bridges between sand grains; 20 percent fine pebbles; neutral; clear smooth boundary.

C2r—15 to 20 inches; gray and white decomposing granite rock with dark brown and black ferromagnesium minerals; evident original rock structure.

The depth to paralithic contact of weathered granite is 10 to 20 inches. Depth to extremely hard rock is about 24 to 72 inches or more. Content of fine pebbles ranges from 10 to 25 percent. These soils are less than 1 percent organic matter in the A horizon. The particle size control section is sand, coarse sand, or loamy sand and is as much as 25 percent fine pebbles.

Godecke Series

The Godecke series consists of very deep, somewhat poorly drained, slowly permeable soils on smooth terraces. These soils formed in alluvium weathered from mixed sources of rock. Slope is 0 to 2 percent.

Typical pedon of Godecke fine sandy loam; about 600 feet east and 50 feet south of the north quarter corner sec. 32, T. 14 N., R. 20 E.

A11—0 to 2 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine vesicular pores; strongly alkaline; abrupt wavy boundary.

A12—2 to 8 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine tubular pores; strongly alkaline; clear smooth boundary.

B2t— 8 to 18 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak medium prismatic structure; hard, friable, sticky and plastic; common very fine and few medium horizontal roots; many very fine tubular pores; common thin clay films on ped faces and as bridges between sand grains; effervescent matrix, strongly effervescent filaments of lime in root channels; strongly alkaline; abrupt smooth boundary.

C1ca—18 to 24 inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 5/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular and many very fine and fine interstitial pores; common coarse distinct very pale brown (10YR 8/3) lime masses; strongly effervescent; strongly alkaline; gradual smooth boundary.

C2sica—24 to 36 inches; pale brown (10YR 6/3) fine sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; common hard and very firm light gray (10YR 7/2) durinodes 1/8 inch to 1 1/2 inches in diameter; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C3sica—36 to 55 inches; pale yellow (5Y 8/3) weakly silica-cemented loamy fine sand, olive (5Y 5/3) moist; few fine and medium prominent black (10YR 2/1) manganese flakes; moderate thick and medium platy structure; very hard, firm, nonsticky and nonplastic; few very fine tubular pores; common medium and large prominent olive gray (5Y 6/2) soft lime masses and nodules; strongly alkaline; abrupt wavy boundary.

C4—55 to 60 inches; pale yellow (5Y 7/3) very fine sandy loam, olive (5Y 5/3) moist; common fine

prominent black (N 2/) manganese mottles and flakes; strong thin platy structure; hard, firm, nonsticky and nonplastic; few fine tubular pores; moderately alkaline.

The thickness of the solum is 14 to 20 inches. These soils are strongly affected by salts and alkali and some pedons are calcareous throughout.

The A horizon has weak to moderate subangular blocky or platy structure or is massive.

The B2t horizon has relic mottles in the lower part of some pedons. It is sandy clay loam or clay loam. This horizon has weak to strong prismatic structure and is 15 to 35 percent exchangeable sodium. The lower part of the B2t horizon is massive in some pedons.

The C horizon commonly is stratified loamy sand, fine sandy loam, and silt loam and in some pedons has strata of sandy clay loam, clay, or silty clay. The Csi horizon has few to many, small or medium, strongly cemented durinodes, or it is weakly cemented.

Gralic Series

The Gralic series consists of very deep, well drained soils on side slopes of mountains. These soils formed in colluvium derived from metavolcanic rock. Permeability is moderately rapid. Slope ranges from 8 to 75 percent.

Typical pedon of Gralic extremely stony very fine sandy loam, 30 to 50 percent slopes, in an area of Gralic-Rock outcrop complex, 8 to 50 percent slopes; about 2,300 feet west of the southeast corner of sec. 18, T. 14 N., R. 19 E.

O1—1 inch to 0; pine needles.

A11—0 to 3 inches; brown (10YR 5/3) extremely stony very fine sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few very fine to medium tubular pores; 55 percent pebbles, 5 percent cobbles, 15 percent stones; medium acid; abrupt smooth boundary.

A12—3 to 9 inches; light brownish gray (10YR 6/2) extremely gravelly very fine sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine to medium and few coarse roots; few very fine and fine tubular pores; 60 percent pebbles, 5 percent cobbles and stones; medium acid; clear smooth boundary.

C1—9 to 29 inches; pale brown (10YR 6/3) extremely gravelly very fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine to medium roots; few very fine interstitial pores; 60 percent pebbles, 5 percent cobbles and stones; medium acid; clear irregular boundary.

C2—29 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine to medium roots; few very fine interstitial pores; 60 percent pebbles, 5 percent cobbles and stones; slightly acid.

The rock fragments in the particle size control section range from 40 to 70 percent. Fragments are mainly pebbles but can be 0 to 30 percent cobbles or stones in any one horizon.

The C horizon is very gravelly or extremely gravelly very fine sandy loam, fine sandy loam, or loam.

Graylock Series

The Graylock series consists of deep, excessively drained, rapidly permeable soils on mountain slopes. These soils formed in material derived from granite. Slope ranges from 30 to 75 percent.

Typical pedon of Graylock extremely stony loamy coarse sand, 30 to 50 percent slopes; about 1,200 feet west and 500 feet south of the northeast corner sec. 18, T. 13 N., R. 19 E.

O1—3 to 2 inches; pine needles.

O2—2 inches to 0; duff.

A11—0 to 3 inches; grayish brown (10YR 5/2) extremely stony loamy coarse sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and few medium roots; many very fine interstitial pores; about 35 percent stones, 5 percent cobbles, 10 percent pebbles; medium acid; abrupt smooth boundary.

A12—3 to 5 inches; grayish brown (10YR 5/2) very stony loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; soft, very friable, nonsticky and nonplastic; about 15 percent stones, 5 percent cobbles, 10 pecent pebbles; medium acid; clear smooth boundary.

C1—5 to 30 inches; light brownish gray (10YR 6/2) extremely stony loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine interstitial pores; about 60 percent stones, 5 percent cobbles, 15 percent pebbles; medium acid; clear wavy boundary.

C2—30 to 42 inches; light brownish gray (10YR 6/2) extremely stony loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; about 65 percent stones, 5 percent cobbles, 15 percent pebbles; medium acid; clear wavy boundary.

R—42 to 60 inches; unweathered granite.

The depth to bedrock is 40 to 60 inches. The particle size control section is extremely stony loamy coarse sand and very stony loamy sand.

The C horizon has base saturation of less than 35 percent.

Greenbrae Series

Greenbrae series consists of very deep, well drained, slowly permeable soils on alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Slope ranges from 0 to 15 percent.

Typical pedon of Greenbrae gravelly fine sandy loam, 4 to 8 percent slopes; about 1,900 feet west and 1,500 feet south of the northeast corner sec. 15, T. 13 N., R. 21 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; 30 percent pebbles; neutral; abrupt smooth boundary.

A12—1 to 9 inches; pale brown (10YR 6/3) gravelly fine sandy loam, brown (10YR 4/3) moist; strong thick platy structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine vesicular and tubular pores; 20 percent pebbles, neutral; abrupt smooth boundary.

B2t—9 to 20 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; strong medium and coarse subangular blocky structure; hard, friable, sticky and plastic; many very fine and few fine roots; common very fine tubular pores; many thin clay films on ped faces and lining pores; 5 percent pebbles; neutral; clear smooth boundary.

B3t—20 to 28 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; few thin clay films coating and bridging sand grains; 10 percent pebbles; neutral; clear smooth boundary.

C1—28 to 44 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots; common very fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.

C2—44 to 48 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; few fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

C3—48 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; few fine tubular pores; 10 percent pebbles; neutral.

The thickness of the solum is 28 to 48 inches.

The B2t horizon is clay loam or sandy clay loam. The C horizon is stratified gravelly sandy loam, sandy loam, and fine sandy loam.

Haybourne Series

The Haybourne series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Permeability is moderately rapid. Slope ranges from 0 to 8 percent.

Typical pedon of Haybourne loam, 0 to 2 percent slopes; about 1,400 feet west of the north quarter corner sec. 33, T. 14 N., R. 20 E.

A11—0 to 3 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate medium to thick platy structure; soft, very friable, nonsticky and nonplastic; many medium and fine vesicular pores; neutral; abrupt smooth boundary.

A12—3 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine vesicular pores; neutral; abrupt smooth boundary.

A13—6 to 15 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and very fine roots; few very fine tubular and many very fine and fine interstitial pores; neutral; clear smooth boundary.

B2—15 to 25 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; common very fine and fine roots; many fine and very fine interstitial pores; common thin clay bridges between sand grains; neutral; clear smooth boundary.

C1—25 to 34 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.

C2—34 to 42 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.

C3—42 to 60 inches; light brownish gray (10YR 6/2) coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many fine and very fine interstitial pores; few spots are slightly effervescent; neutral.

The thickness of the solum is 18 to 32 inches. Some pedons are slightly effervescent to strongly effervescent below a depth of 30 inches. Some pedons have stratified, very gravelly fine sand to cobbly sand subhorizons below a depth of 40 inches.

The A horizon has granular or platy structure or is massive. The B2 horizon ranges from coarse sandy loam to fine sandy loam. It has subangular blocky structure or is massive. The C horizon is stratified and ranges from fine sandy loam to coarse sand.

Heidtman Series

The Heidtman series consists of very deep, somewhat poorly drained soils on smooth, nearly level flood plains. These soils formed in alluvium derived dominantly from granitic rock. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical profile of Heidtman clay loam; about 1,200 feet north and 2,000 feet east of the southwest corner sec. 11, T. 13 N., R. 19 E.

Ap—0 to 7 inches; gray (10YR 5/1) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine interstitial pores; mildly alkaline; abrupt smooth boundary.

B2—7 to 16 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure; hard, friable, sticky and plastic; many very fine roots; common very fine and fine tubular pores; moderately alkaline; clear smooth boundary.

C1ca—16 to 25 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine pores; slightly effervescent; moderately alkaline; clear smooth boundary.

C2ca—25 to 47 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; few fine faint yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) moist iron mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine to fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; abrupt smooth boundary.

IIC3—47 to 60 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; common very coarse distinct strong brown (7.5YR 5/6) and many fine prominent yellowish brown (5YR 5/8) iron mottles; loose, nonsticky and nonplastic; single grain; few very fine and fine roots; many fine interstitial pores; mildly alkaline.

The thickness of the mollic epipedón is 10 to 18 inches. The partical size control section is dominantly stratified clay loam, sandy clay loam, or loam that is 20 to 35 percent clay. It also has strata of fine sandy loam, sandy loam, loamy sand, or sand.

The Cca horizon is slightly effervescent to violently effervescent. The IIC horizon is at a depth of 40 to 50 inches. It is commonly sand but has gravel or clay in some pedons.

Henningsen Series

The Henningsen consists of very deep, somewhat poorly drained, very rapidly permeable soils on smooth flood plains and low alluvial terraces. These soils formed in alluvium derived primarily from granite with admixtures of basalt, andesite, rhyolite, and some gneiss, shist, and slate. Slope is 0 to 2 percent.

Typical pedon of Henningsen gravelly loam; about 2,500 feet north and 1,400 feet east of the southwest corner of sec. 9, T. 12 N., R. 20 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; slightly hard, friable, nonsticky and slightly plastic; very fine and fine and few medium roots; many fine and medium interstitial pores; 25 percent pebbles; neutral; clear smooth boundary.

A1—7 to 13 inches; grayish brown (10YR 5/2) very gravelly very fine sandy loam, very dark grayish brown (10YR 3/2) moist; few fine and medium faint brown (10YR 4/3) iron mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and common medium tubular pores; 35 percent pebbles; neutral; clear smooth boundary.

C1—13 to 20 inches; grayish brown (2.5Y 5/2) very gravelly loamy coarse sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 55 percent pebbles and cobbles; neutral; clear smooth boundary.

C2—20 to 60 inches; grayish brown (2.5Y 5/2) extremely gravelly coarse sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and medium interstitial pores; 70 percent pebbles and cobbles; neutral.

Thickness of the mollic epipedon is 7 to 14 inches. The particle size control section is loamy sand, loamy coarse sand, sand, or coarse sand modified with 50 to 80 percent pebbles or cobbles. Few or common faint iron mottles are in the lower part of the A horizon or in the C horizon.

The A horizon has medium or fine granular structure or medium thin platy, or it is massive. The C horizon is massive or single grain.

Henningsen Variant

The Henningsen Variant consists of very deep, somewhat poorly drained soils on low stream terraces. These soils formed in alluvium derived primarily from granite with admixtures of basalt, andesite, rhyolite, gneiss, and slate. Permeability is moderately rapid. Slope is 0 to 2 percent.

Typical pedon of Henningsen Variant loam; about 300 feet south and 600 feet east of the northwest corner sec. 14, T. 12 N., R. 20 E.

Ap—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; abrupt smooth boundary.

A12—3 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and few fine tubular pores; neutral; clear smooth boundary.

C1—9 to 28 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; 5 percent fine rounded gravel; neutral; abrupt smooth boundary.

IIC2—28 to 60 inches; grayish brown (10YR 5/2) very gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; many fine interstitial pores; neutral.

Thickness of the mollic epipedon is 7 to 14 inches. The upper part of the C horizon is stratified fine sandy loam or loam and has thin strata of clay loam. The IIC horizon is at a depth of 20 to 40 inches. Few to common, fine to coarse, high chroma iron mottles are below a depth of 20 inches.

Holbrook Series

The Holbrook series consists of very deep, well drained soils on alluvial fans and drainageways. These soils formed in mixed alluvium. Permeability is moderately rapid. Slope ranges from 2 to 15 percent.

Typical pedon of Holbrook gravelly fine sandy loam, 2 to 8 percent slopes; about 1,000 feet west and 520 feet south of the northeast corner sec. 26, T. 14 N., R. 19 E.

A11—0 to 4 inches; gray (10YR 5/1) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 20 percent pebbles; highly micaceous; neutral; clear smooth boundary.

A12—4 to 15 inches; gray (10YR 5/1) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to weak fine subangular blocky; slightly hard, friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and fine tubular pores; 15 percent pebbles, 15 percent cobbles; highly micaceous; neutral; clear wavy boundary.

C—15 to 60 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots in the upper part grading to few very fine in the lower part; very fine and fine tubular pores; 40 percent pebbles, 5 percent cobbles, 10 percent stones; highly micaceous; neutral.

Thickness of the mollic epipedon is 10 to 20 inches. The particle size control section is stratified. It ranges from stony sand to extremely gravelly loam. The rock fragments range from 35 to 50 percent, mainly pebbles.

Hussman Series

The Hussman series consists of very deep, somewhat poorly drained, slowly permeable soils on alluvial terraces. These soils formed in alluvium weathered primarily from granite but partly from rhyolite, basalt, and metamorphic and sedimentary rock. Slope is 0 to 2 percent.

Typical pedon of Hussman clay; about 2,800 feet south and 300 feet east of the northwest corner sec. 3, T. 12 N., R. 20 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium subangular blocky structure; very hard, firm, very sticky and very plastic; many very fine to medium roots; many very fine and fine tubular pores; few wormholes; mildly alkaline; clear smooth boundary.

A1—7 to 12 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate coarse and medium subangular blocky; very hard, firm, very sticky and very plastic; many very fine to medium roots; common fine and medium tubular pores; few wormholes; mildly alkaline; clear wavy boundary.

AC—12 to 28 inches; brown (10YR 5/3) silty clay, dark grayish brown (10YR 4/2) moist; common fine distinct dark reddish brown (5YR 3/3) moist iron mottles; weak coarse subangular blocky structure; very hard, friable, very sticky and very plastic; many very fine and fine roots; common very fine and fine tubular pores; common fine strongly effervescent lime filaments; moderately alkaline; clear wavy boundary.

C1ca—28 to 42 inches; light brownish gray (10YR 6/2) silty clay loam, dark brown (10YR 4/3) moist; common fine and medium distinct dark reddish brown (5YR 3/3) moist iron mottles; massive; very hard, friable, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; many fine soft masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—42 to 54 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; common fine and medium dark reddish brown (5YR 3/3) moist iron mottles; massive; hard, friable, sticky and plastic; few very fine and fine roots; few very fine tubular pores; strongly effervescent in a few small spots; moderately alkaline; clear wavy boundary.

C3—54 to 60 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; common fine distinct dark reddish brown (5YR 3/3) moist iron mottles; massive; very hard, firm, very sticky and very plastic; many very fine interstitial pores; slightly effervescent; moderately alkaline.

The thickness of the mollic epipedon is 10 to 16 inches. Finely divided mica is throughout most pedons. The particle size control section is stratified clay loam, silty clay loam, silty clay, or clay.

The C horizon generally has some segregated lime in all horizons below a depth of about 12 inches.

Hyloc Series

The Hyloc series consists of shallow, well drained, slowly permeable soils on the south slopes of mountains. These soils formed in the residuum of andesite. Slope ranges from 15 to 30 percent.

Typical pedon of Hyloc very cobbly sandy loam, 15 to 30 percent slopes, in an area of Hyloc-Ister association; about 2,000 feet west and 1,500 feet south of the northeast corner sec. 15, T. 14 N., R. 22 E.

A1—0 to 7 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; moderate thick platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine tubular pores; 35 percent cobbles and 20 percent pebbles; neutral; abrupt smooth boundary.

B1t—7 to 9 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; strong medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine and few medium roots; many very fine and few medium and coarse roots; 40 percent pebbles; many thin clay films on ped faces and lining pores; abrupt smooth boundary.

B2t—9 to 17 inches; brown (7.5YR 5/4) gravelly clay, dark brown (7.5YR 4/4) moist; strong medium and coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; common very fine and few fine and medium roots; common very fine and fine tubular pores; 30 percent pebbles; continuous moderately thick clay films coating ped faces and lining pores; neutral; clear smooth boundary.

B3t—17 to 19 inches; light brown (10YR 6/4) gravelly sandy clay loam; dark brown (10YR 4/4) moist; strong medium subangular blocky structure; very hard, very firm, sticky and plastic; few fine tubular pores; 30 percent pebbles; many thin clay films on ped faces and lining pores; neutral; abrupt wavy boundary.

Cr—19 to 23 inches; weathered andesite; clear smooth boundary.

R—23 inches; andesite.

The thickness of the mollic epipedon is 7 to 14 inches. Solum thickness and the depth to paralithic contact is 14 to 20 inches. Depth to hard bedrock is 20 to 30 inches.

The A horizon has platy or granular structure. The B2t horizon is modified with 15 to 35 percent coarse fragments, mainly pebbles.

Incy Series

The Incy series consists of very deep, excessively drained, very rapidly permeable soils on partly stabilized dunes. These soils formed in eolian sand weathered from mixed sources of rock, dominantly granite. Slope ranges from 2 to 30 percent.

Typical pedon of Incy fine sand, 4 to 30 percent slopes; about 100 feet south of the northwest quarter corner sec. 13, T. 14 N., R. 20 E.

C1—0 to 4 inches; pale brown (10YR 6/3) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine interstitial pores; neutral; clear smooth boundary.

C2—4 to 60 inches; light brownish gray (10YR 6/2) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common fine and very fine roots; many very fine and fine interstitial pores; neutral.

The particle size control section is commonly fine sand but ranges to medium sand in some pedons.

Indian Creek Series

The Indian Creek series consists of shallow, well drained, very slowly permeable soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed sources of rock. Slope ranges from 0 to 15 percent.

Typical pedon of Indian Creek very cobbly loam, 2 to 8 percent slopes, in an area of Indian Creek-Reno-Cassiro association; about 1,520 feet west and 1,500 feet north of the southeast corner sec. 12, T. 11 N., R. 20 E.

A11—0 to 1 inch; gray (10YR 6/1) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, friable, slightly sticky and slightly plastic; many very fine roots; common fine and very fine vesicular pores; few uncoated sand grains; 55 percent rock fragments; neutral; abrupt wavy boundary.

A12—1 inch to 3 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to strong fine granular; soft, friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many fine and very fine interstitial pores; many uncoated sand grains; 15 percent rock fragments; slightly acid; abrupt wavy boundary.

A&B—3 to 5 inches; brown (10YR 5/3) gravelly heavy clay loam, dark brown (10YR 3/3) moist; strong fine subangular blocky structure; hard, friable, very sticky and very plastic; many very fine, common fine, and few medium roots; common very fine and fine tubular and interstitial pores; few uncoated sand grains; many thin clay films on ped faces; 15 percent rock fragments; slightly acid; abrupt wavy boundary.

B21t—5 to 11 inches; brown (7.5YR 4/2) gravelly clay, dark brown (7.5YR 3/2) moist; strong medium columnar structure; extremely hard, very firm, very sticky and very plastic; many very fine, common fine, and few medium exped roots; common very fine and fine tubular pores; many pressure cutans; 20 percent pebbles; slightly acid; clear smooth boundary.

B22t—11 to 19 inches; dark brown (7.5YR 4/2) gravelly clay, dark brown (7.5YR 3/2) moist; strong medium prismatic structure; extremely hard, very firm, very sticky and very plastic; common very fine, few fine and medium exped roots; few very fine and fine tubular pores; many pressure cutans; 20 percent pebbles; neutral; abrupt wavy boundary.

B3t—19 to 20 inches; yellowish brown (10YR 5/4) gravelly clay, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; hard, friable, very sticky and very plastic; common very fine, few fine and medium roots; few fine tubular pores; common moderately thick clay films on ped faces and lining pores; 30 percent pebbles; slightly effervescent; neutral; abrupt wavy boundary.

IIC1sicam—20 to 25 inches; white (10YR 8/2) indurated duripan, light yellowish brown (10YR 6/4) moist; massive; extremely hard and very hard, extremely firm and very firm; few very fine and fine roots; few very fine interstitial pores; 70 percent rock fragments; violently effervescent; strongly alkaline; abrupt wavy boundary.

IIC2sica—25 to 36 inches; light gray (10YR 7/2) extremely gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many fine interstitial pores; 75 percent rock fragments; lime coatings on underside of pebbles and cobbles; slightly effervescent; mildly alkaline; clear wavy boundary.

IIC3ca—36 to 51 inches; light brownish gray (10YR 6/2) extremely gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many fine interstitial pores; 80 percent rock fragments; slightly effervescent matrix, violently effervescent on underside of rock fragments; mildly alkaline; gradual smooth boundary.

IIIC4—51 to 64 inches; light brownish gray (10YR 6/2) extremely gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many fine interstitial pores; 60 percent rock fragments; mildly alkaline.

The thickness of the solum and depth to the indurated duripan is 14 to 20 inches.

The A horizon has platy, granular, or subangular blocky structure. The surface commonly has a desert pavement of pebbles or cobbles. The B2t horizon is clay, sandy clay, or gravelly clay modified with 5 to 35 percent rock fragments. The duripan has thin continuous indurated capping or platelets and weakly cemented to strongly silica-cemented material. The C horizon is loamy coarse sand or coarse sandy loam. It is 40 to 80 percent rock fragments. The rock fragments have lime coatings on the undersides.

Indian Creek Variant

The Indian Creek Variant consists of shallow, well drained soils on terraces and hills. These soils formed in alluvium derived from mixed alluvium. Permeability is moderately slow. Slope ranges from 15 to 50 percent.

Typical pedon of Indian Creek Variant very gravelly loam, 15 to 50 percent slopes, in an area of Indian Creek Variant-Cassiro-Puett association; about 500 feet west and 2,000 feet north of the southeast corner sec. 30, T. 12 N., R. 21 E.

A1— 0 to 3 inches; light brownish gray (10YR 6/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; massive parting to strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine interstitial pores; 50 percent pebbles; mildly alkaline; abrupt smooth boundary.

B21t—3 to 4 inches; light brownish gray (10YR 6/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common thin clay films on ped faces and lining pores; 30 percent pebbles; mildly alkaline; abrupt irregular boundary.

B22t—4 to 7 inches; dark grayish brown (10YR 6/3) gravelly clay loam, dark brown (10YR 4/3) moist; strong coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine to medium roots; few very fine tubular pores; many thin clay films on ped faces and lining pores; 30 percent pebbles; mildly alkaline; clear irregular boundary.

B31t—7 to 12 inches; light brownish gray (10YR 6/2) very gravelly clay loam, dark grayish brown (10YR 4/2) moist; strong medium subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine, common fine, and few medium roots; few very fine, fine, and medium tubular pores; 55 percent pebbles; many thin clay films on ped faces and lining pores; mildly alkaline; clear smooth boundary.

B32t—12 to 18 inches; light gray (10YR 7/2) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, sticky and plastic; few very fine to medium roots; common very fine tubular pores; many thin clay films lining pores; 60 percent pebbles; mildly alkaline; abrupt wavy boundary.

C1sicam—18 to 39 inches; white (10YR 8/1) continuous thin silica laminae and alternating layers of indurated and strongly cemented duripan; few very fine to medium roots along fracture plains; abrupt wavy boundary.

C2ca—39 to 60 inches; light gray (10YR 7/1) very gravelly loamy sand, gray (10YR 6/1) moist; massive; slightly hard, friable, nonsticky and nonplastic; 40 percent pebbles; strongly effervescent; moderately alkaline.

The thickness of the solum and depth to the indurated duripan is 12 to 18 inches.

The Bt horizon averages 35 to 60 percent pebbles and cobbles. The duripan is 5 to 25 inches thick. It has indurated silica laminae separated by alternating layers of indurated and strongly cemented material. The C horizon is very gravelly loamy sand and sand modified with 35 to 60 percent pebbles and cobbles. Lime coatings are on the rock fragments.

Indiano Series

The Indiano series consists of moderately deep, well drained soils on foothills. These soils formed in residuum and colluvium derived from rhyolite and altered volcanic rocks. Permeability is moderately slow. Slope ranges from 30 to 50 percent.

Typical pedon of Indiano stony fine sandy loam, 30 to 50 percent slopes; about 800 feet west and 1,500 feet north of the southeast corner sec. 16, T. 14 N., R. 20 E.

A1—0 to 6 inches; brown (10YR 5/3) stony fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 40 percent stones, cobbles, and pebbles; slightly acid; gradual smooth boundary.

A3—6 to 13 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 15 percent pebbles and 10 percent cobbles; slightly acid; clear smooth boundary.

B2t—13 to 24 inches; light yellowish brown (10YR 6/4) gravelly clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and plastic; common very fine and few fine and medium roots; many very fine and common medium tubular pores; thin continuous clay films in pores; many clay bridges between sand grains; 15 percent pebbles, 8 percent cobbles; slightly acid; gradual wavy boundary.

B3t—24 to 33 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; common thin clay films lining pores; few clay bridges between sand grains; slightly acid; abrupt irregular boundary.

R—33 inches; rhyolite that becomes extremely hard at a depth of 37 inches.

The thickness of the mollic epipedon is 7 to 14 inches. The solum thickness and depth to lithic contact ranges from 20 to 40 inches.

A3 or B1 horizons are present in some pedons. The B2t horizon is clay loam or sandy clay loam modified with 15 to 35 percent pebbles and cobbles. It has prismatic or subangular blocky structure, or it is massive. The underlying bedrock is rhyolite or other altered volcanic bedrock and is commonly weathered in the upper 1 to 4 inches.

Ister Series

The Ister series consists of moderately deep, well drained soils on mountain slopes. These soils formed in

the residuum of andesite. Permeability is moderately slow. Slope ranges from 30 to 50 percent.

Typical pedon of Ister extremely stony sandy loam, 30 to 50 percent slopes, in an area of Hyloc-Ister association; about 100 feet west and 500 feet south of the northeast corner sec. 15, T. 14 N., R. 22 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) extremely stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; many very fine tubular pores; 30 percent stones, 35 percent pebbles; mildly alkaline; abrupt smooth boundary.

A12—4 to 10 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 20 percent pebbles, 10 percent cobbles, neutral; clear smooth boundary.

B1t—10 to 16 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many very fine tubular pores; few thin clay films coating sand grains; 20 percent pebbles, 10 percent cobbles; neutral; clear smooth boundary.

B21t—16 to 30 inches; yellowish brown (10YR 5/4) very stony clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common very fine to medium and few coarse roots; many very fine, common fine, and few medium tubular pores; common thin clay films on ped faces; 15 percent pebbles, 10 percent cobbles, 20 percent stones; neutral; clear smooth boundary.

B22t—30 to 37 inches; yellowish brown (10YR 5/4) very stony clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine to coarse roots; common very fine and fine and medium tubular pores; many thin clay films on ped faces and lining pores; 20 percent pebbles, 35 percent stones; neutral; very abrupt irregular boundary.

R—37 inches; andesitic bedrock.

The thickness of the mollic epipedon is 10 to 18 inches. The solum thickness and depth to bedrock is 25 to 40 inches.

The B2t horizon is very stony clay loam or very stony sandy clay loam.

James Canyon Series

The James Canyon series consists of very deep, poorly drained, moderately permeable soils on alluvial fans and flood plains. These soils formed in mixed alluvium. Slope ranges from 2 to 15 percent.

Typical pedon of James Canyon loam, drained, 2 to 4 percent slopes; about 2,100 feet east and 1,500 feet north of the southwest corner sec. 3, T. 13 N., R. 19 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loam, black (10YR 2/1) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and few fine tubular pores; 10 percent pebbles; neutral; abrupt smooth boundary.

A1—8 to 31 inches; grayish brown (10YR 5/2) loam, black (10YR 2/1) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent pebbles; few medium wormholes; neutral; gradual smooth boundary.

C1—31 to 41 inches; grayish brown (2.5Y 5/2) gravelly loam, dark grayish brown (2.5Y 4/2) moist; few medium and coarse strong brown (7.5YR 5/6) iron mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; 30 percent pebbles; neutral; gradual smooth boundary.

C2—41 to 60 inches; light brownish gray (2.5Y 6/2) gravelly loam, dark grayish (2.5Y 4/2) moist; many medium and coarse prominent strong brown (7.5YR 5/6) iron mottles; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; 30 percent pebbles and cobbles; neutral.

The thickness of the mollic epipedon is 24 to 36 inches. The particle size control section averages gravelly loam or gravelly silt loam that is 18 to 27 percent clay and 15 to 35 percent pebbles.

James Canyon Variant

The James Canyon Variant consists of very deep, poorly drained, moderately permeable soils on slightly concave alluvial fans and in interfan areas. These soils formed in alluvium derived mainly from granite, gneiss, and slate. Slope ranges from 2 to 8 percent.

Typical pedon of James Canyon Variant loam, 2 to 4 percent slopes; about 1,650 feet south and 700 feet east of the northwest corner of sec. 14, T. 14 N., R. 19 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate fine and medium granular structure; slightly hard, friable, nonsticky and nonplastic; many fine and very fine roots; many fine and very fine interstitial pores; micaceous; neutral; abrupt smooth boundary.

A1—9 to 15 inches; very dark gray (10YR 3/1) sandy clay loam, black (10YR 2/1) moist; common faint very dark grayish brown (10YR 3/2) moist and few medium distinct dark reddish brown (5YR 3/3) moist iron mottles; weak medium and fine granular structure; slightly hard, firm, friable, sticky and plastic; common very fine and fine roots; few fine and medium wormholes; common fine tubular pores; micaceous; neutral; abrupt smooth boundary.

C1ca—15 to 30 inches; about 65 percent white (10YR 8/2) and 35 percent grayish brown (10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, sticky and plastic; common very fine and fine roots; many very fine to medium tubular pores; violently effervescent; moderately alkaline; gradual wavy boundary.

C2ca—30 to 36 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; micaceous; violently effervescent; moderately alkaline; clear smooth boundary.

C3g—36 to 42 inches; brown (10YR 5/3) loamy sand, brown (10YR 4/3) moist; few medium and coarse distinct reddish brown (5YR 4/4) moist iron mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; micaceous; neutral; clear smooth boundary.

C4g—42 to 53 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; few medium and coarse distinct reddish brown (5YR 5/4) moist iron mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine and fine interstitial pores; neutral; abrupt smooth boundary.

C5g—53 to 60 inches; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 5/3) moist; many medium prominent strong brown (7.5YR 5/6) and common coarse distinct reddish brown (5YR 4/4) moist iron mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine interstitial pores; highly micaceous; neutral.

The thickness of the mollic epipedon is 15 to 24 inches thick. Faint mottles are common in the lower part of the A horizon of some pedons. A thin mat of roots is common in the surface layer where these soils have not been cultivated.

Job Series

The Job series consists of very deep, somewhat poorly drained, moderately permeable soils on smooth flood plains. These soils formed in alluvium weathered from primarily granitic rock. Slope is 0 to 2 percent.

Typical pedon of Job loam; in about the center of sec. 14, T. 13 N., R. 19 E.

A1— 0 to 9 inches; light brownish gray (2.5Y 6/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak medium and fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine interstitial pores; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C1— 9 to 25 inches; light brownish gray (10YR 6/2) stratified very fine sandy loam and fine sandy loam, dark grayish brown (10YR 4/2) moist; few prominent white (10YR 8/2) lime filaments; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular and many very fine interstitial pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

IIC2—25 to 32 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few very fine and fine prominent white (10YR 8/2) lime filaments; weak medium prismatic structure; very hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; violently effervescent; strongly alkaline; abrupt smooth boundary.

IIIC3—32 to 51 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; slightly effervescent matrix; many very fine and fine strongly effervescent white (10YR 8/2) lime filaments; moderately alkaline; clear wavy boundary.

IVC4—51 to 60 inches; grayish brown (2.5Y 5/2) light clay loam, very dark grayish brown (2.5Y 3/2) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular and interstitial pores; common fine and medium violently effervescent light gray (10YR 7/2) lime filaments; moderately alkaline.

The particle size control section is stratified fine sandy loam clay loam to clay loam. Strata of gravel or sand are below a depth of 48 inches. Iron mottles are below a depth of 40 inches in some pedons.

Job Variant

The Job Variant consists of very deep, somewhat poorly drained, moderately permeable soils on low terraces that are hummocky because of soil blowing. These soils formed in alluvium derived mainly from granite, but minor amounts were derived from basalt, rhyolite, gneiss, sandstone, and slate. The alluvium has accumulated large quantities of gypsum precipitated from hot spring water. Slope is 0 to 2 percent.

Typical pedon of Job Variant silt loam; about 300 feet south and 1,300 feet west of the east quarter corner sec. 20, T. 14 N., R. 20 E.

A1—0 to 7 inches (a salt crust 1/8 to 1/4 inch thick on the surface); white (N 8/) gypsiferous silt loam, gray (10YR 6/1) moist; massive to a depth of 2 inches, then moderate medium to thin platy structure; soft, very friable, nonsticky and slightly plastic; many very fine and common medium saltgrass stolons; many very fine vesicular pores in uppermost 2 inches, and many very fine tubular pores below; violently effervescent; moderately alkaline; abrupt wavy boundary.

C1—7 to 13 inches; white (10YR 8/1) gypsiferous silt loam, gray (10YR 6/1) moist; moderate medium to thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2cs—13 to 22 inches; white (N 8/) gypsiferous silt loam, gray (10YR 6/1) moist; weak thin platy structure; hard, friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; violently effervescent; mildly alkaline; gradual smooth boundary.

C3cs—22 to 46 inches; white (N 8/) gypsiferous silt loam, gray (10YR 6/1) moist; massive; hard, friable, nonsticky and slightly plastic; very few very fine roots; many very fine tubular pores; few medium and coarse distinct dark brown (7.5YR 3/2) moist iron mottles; violently effervescent; moderately alkaline; diffuse smooth boundary.

C4csca—46 to 60 inches; white (N 8/) gypsiferous silt loam, gray (10YR 6/1) moist; massive; hard, friable, nonsticky and slightly plastic; common very fine tubular and interstitial pores; common medium distinct dark gray (5Y 4/2) moist and common medium and coarse distinct dark brown (7.5YR 4/4) moist iron mottles; few to common gypsum nodules 1/8 to 1/2 inch in diameter; violently effervescent; moderately alkaline.

Few to many, hard to very hard gypsum nodules are below a depth of 40 inches. Gypsum throughout the profile ranges from 15 to 25 percent, but the percent content has no order in sequence from one stratum to another. The soil material is noneffervescent to violently effervescent in some layers below a depth of 36 inches. Buried A horizons are common.

Jubilee Series

The Jubilee series consists of very deep, poorly drained soils on flood plains in slightly concave low depressions and sloughs. These soils formed in mixed alluvium derived mainly from granitic rock, but minor amounts were derived from basalt, rhyolite, andesite, gneiss, and slate. Permeability is moderately rapid. Slope is 0 to 2 percent.

Typical pedon of Jubilee loam; about 2,600 feet north and 2,400 feet east of the southwest corner sec. 29, T. 12 N., R. 20 E.

A11—0 to 5 inches; dark gray (10YR 4/1) loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A12—5 to 15 inches; dark gray (10YR 4/1) fine sandy loam, very dark gray (10YR 3/1) moist; many fine prominent dark reddish brown (5YR 3/3) iron mottles; hard, very firm, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; abrupt smooth boundary.

AC—15 to 19 inches; grayish brown (10YR 5/2) fine sandy loam, very dark brown (10YR 2/2) moist; many coarse prominent dark reddish brown (5YR 3/3) iron mottles; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

C1—19 to 37 inches; pale olive (5Y 6/3) sandy loam, olive (5Y 4/3) moist; many coarse prominent reddish yellow (5YR 5/6) and dark reddish brown (5YR 3/4) iron mottles; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; neutral; clear irregular boundary.

IIC2—37 to 45 inches; olive (5Y 5/3) highly micaceous loamy sand, olive gray (5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; neutral; clear irregular boundary.

IIIC3—45 to 60 inches; light olive gray (5Y 6/2) micaceous coarse sand, olive gray (5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine and fine interstitial pores; neutral.

The thickness of the mollic epipedon ranges from 12 to 23 inches. In some pedons distinct or prominent iron mottles are in or immediately below the mollic epipedon. Few to many mica flakes are present throughout the pedon.

The C horizon in some pedons has uncomformable layers of very gravelly loamy coarse sand or very gravelly coarse sand below a depth of 48 inches.

Jubilee Variant

The Jubilee Variant consists of very deep, very poorly drained soils on flood plains. These soils formed in mixed alluvium derived mainly from granitic and volcanic

sources of rock. Permeability is moderately rapid. Slope is 0 to 2 percent.

Typical pedon of Jubilee Variant peat; about 700 feet north of the southeast corner sec. 18, T. 12 N., R. 20 E.

O1—0 to 6 inches; very dark gray (10YR 3/1) peat, black (10YR 2/1) moist; slightly acid; abrupt smooth boundary.

A11—6 to 18 inches; dark grayish brown (10YR 4/2) sandy loam, black (10YR 2/1) moist; few fine prominent brown (7.5YR 5/4) moist iron mottles; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine and medium roots; many very fine tubular pores; neutral; clear smooth boundary.

A12g—18 to 21 inches; dark grayish brown (10YR 4/2) sandy loam, very dark gray (10YR 3/1) moist; many coarse prominent dark reddish brown (5YR 3/3) moist iron mottles; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; neutral; clear smooth boundary.

C1g—21 to 47 inches; light olive gray (5Y 6/2) stratified sandy loam and fine sandy loam, olive (5Y 4/3) moist; many fine distinct yellowish red (5YR 5/6) moist iron mottles; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

C2g—47 to 60 inches; light olive gray (5Y 6/2) stratified sandy loam and coarse sand, olive (5Y 4/3) moist; many fine yellowish red (5YR 5/6) moist iron mottles; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; neutral.

The O1 horizon is 4 to 8 inches thick. The mollic epipedon is 12 to 18 inches thick. It has common distinct or prominent iron mottles.

The C horizon has distinct or prominent mottles. It is stratified sandy loam to fine sandy loam in the upper part and stratified sandy loam to coarse sand in the lower part. The C horizon in some pedons has uncomformable gravelly sand or very gravelly sand below a depth of 48 inches.

Kimmerling Series

The Kimmerling series consists of very deep, poorly drained and very poorly drained soils on smooth flood plains. These soils formed in mixed alluvium derived mainly from granitic rock but also from basalt, rhyolite, gneiss, and slate. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical pedon of Kimmerling clay loam; about 400 feet north and 40 feet west of the south quarter corner sec. 6, T. 12 N., R. 20 E.

A11— 0 to 3 inches; dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; abrupt smooth boundary.

A12—3 to 8 inches; dark gray (10YR 4/1) silt loam, very dark gray (10YR 2/2) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

A13—8 to 18 inches; dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) moist; common fine prominent reddish brown (5YR 4/4) iron mottles; weak coarse subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; few very fine tubular and many very fine interstitial pores; neutral; gradual smooth boundary.

A14—18 to 28 inches; gray (5Y 5/1) silty clay loam, black (5Y 2/1) moist; massive; hard, friable, sticky and plastic; many very fine and few fine roots; neutral; gradual smooth boundary.

A15—28 to 48 inches; gray (5Y 5/1) silty clay loam, very dark gray (5Y 3/1) moist; few very fine prominent reddish brown (5YR 4/4) and few fine faint dark greenish gray (5Y 4/1) iron mottles; massive; hard, firm, sticky and plastic; few very fine and fine roots; neutral; gradual smooth boundary.

Cg—48 to 60 inches; light gray (5Y 6/1) stratified sandy clay loam and silty clay loam, gray (5Y 5/1) moist; few fine and medium faint greenish gray (5GY 5/1) iron mottles; few medium and coarse prominent black (10YR 2/1) manganese stains; massive; hard, firm, sticky and plastic; few fine roots; neutral.

The thickness of the mollic epipedon is 40 to 50 inches. The particle size control section averages silty clay loam or clay loam. Most pedons are slightly or moderately micaceous throughout.

The A horizon is dominantly stratified loam, silt loam, clay loam, and silty clay loam, but strata less than 6 inches thick of fine sandy loam or loamy fine sand are below a depth of 30 inches in some pedons. The C horizon is dominantly stratified fine gravelly loamy sand to silty clay loam but is clay in some pedons.

Kimmerling Variant

The Kimmerling Variant consists of very deep, very poorly drained, moderately permeable soils on alluvial fans. These soils formed in alluvium derived from mixed sources of rock. Slope ranges from 2 to 8 percent.

Typical pedon of Kimmerling Variant peat, 2 to 8 percent slopes; about 1,500 feet south and 1,900 feet east of the northwest corner sec. 15 T. 13 N., R. 19 E.

O1—0 to 8 inches; very dark gray (10YR 3/1) peat, black (10YR 2/1) moist; slightly acid; abrupt smooth boundary.

A1—8 to 32 inches; grayish brown (10YR 5/2) loam, black (10YR 2/1) moist; few medium and coarse strong brown (7.5YR 5/6) iron mottles; massive; hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; 10 percent pebbles; neutral; gradual smooth boundary.

Cg—32 to 60 inches; gray (5Y 5/1) stratified gravelly loam and gravelly clay loam, black (5Y 2.5/1) moist; few medium and coarse prominent dark greenish gray (5GY 4/1) mottles; massive; hard, friable, slightly sticky, slightly plastic; common fine and medium roots; common very fine to medium tubular pores; 15 percent pebbles; neutral.

The thickness of the mollic epipedon is 18 to 36 inches. The O1 horizon ranges from 8 to 12 inches in thickness. The C horizon is stratified gravelly loam and gravelly clay loam.

Koontz Series

The Koontz series consists of shallow, well drained soils on uplands or low mountains. These soils formed in residuum and colluvium weathered from metavolcanic rock. Permeability is moderately slow. Slope ranges from 15 to 50 percent.

Typical pedon of Koontz extremely stony loam in an area of Koontz-Sutro complex, 30 to 50 percent slopes; about 1,000 feet north and 2,000 east of the southwest corner sec. 27, T. 9 N., R. 23 E.

A11—0 to 1 inch; brown (10YR 4/3) extremely stony loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 35 percent pebbles and stones; mildly alkaline; abrupt smooth boundary.

A12—1 inch to 3 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; 45 percent pebbles; mildly alkaline; abrupt wavy boundary.

B2t—3 to 14 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; strong medium and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine and medium roots; common very fine and few fine tubular pores; common thin clay films on faces of peds and lining pores; 55 percent rock fragments; mildly alkaline; abrupt wavy boundary.

Cr—14 to 22 inches; soft, fractured metavolcanic bedrock.

The thickness of the solum and the depth to paralithic contact is 10 to 20 inches.

The B2t horizon is loam or clay loam. It is 40 to 65 percent pebbles and 1 to 10 percent cobbles.

Kram Series

The Kram series consists of very shallow, somewhat excessively drained, moderately permeable soils on side slopes of hills. These soils formed in the residuum of limestone. Slope ranges from 15 to 50 percent.

Typical pedon of Kram very gravelly very fine sandy loam, 15 to 50 percent slopes, in an area of Kram-Puett Variant association; about 2,080 feet west and 1,650 feet north of the southeast corner sec. 15, T. 12 N., R. 21 E.

A1—0 to 3 inches; pale brown (10YR 6/3) very gravelly very fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 50 percent pebbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

C—3 to 10 inches; pale brown (10YR 6/3) very gravelly very fine sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; common very fine tubular pores; 50 percent pebbles; violently effervescent; strongly alkaline; abrupt smooth boundary.

R—10 inches; hard fractured limestone.

The depth to bedrock is 8 to 14 inches.

The C horizon is fine sandy loam and loam. It is 45 to 55 percent pebbles.

Loomer Series

The Loomer series consists of shallow, well drained, slowly permeable soils on foothills. These soils formed in residuum weathered from andesitic rock. Slope ranges from 15 to 50 percent.

Typical pedon of Loomer extremely cobbly loam, 30 to 50 percent slopes, in an area of Loomer association; about 1,200 feet east and 700 feet south of the northwest corner sec. 1., T. 13 N., R. 23 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) extremely cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular; soft, very friable, nonsticky and slightly plastic; few very fine to coarse roots; many very fine interstitial pores; 35 percent cobbles, 25 percent pebbles; mildly alkaline; clear smooth boundary.

B1t—2 to 4 inches; brown (7.5YR 5/2) very gravelly clay loam, dark brown (7.5YR 3/2) moist; strong very fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; few thin clay films on faces of peds; 50 percent pebbles; mildly alkaline; clear smooth boundary.

B21t—4 to 12 inches; reddish brown (5YR 4/3) extremely cobbly clay, dark reddish brown (5YR 3/3) moist; strong medium prismatic structure parting to strong very fine subangular blocky; hard, firm, very sticky and very plastic; few fine and medium roots; common very fine tubular pores; continuous thin clay films on faces of peds; 30 percent pebbles, 30 percent cobbles; mildly alkaline; clear smooth boundary.

B22t—12 to 19 inches; reddish brown (5YR 4/3) extremely gravelly clay, dark reddish brown (5YR 3/3) moist; massive; hard, firm, very sticky and very plastic; few very fine roots; few fine tubular pores; continuous thick clay films coating rock fragments; 70 percent angular pebbles, 10 percent cobbles; mildly alkaline; clear irregular boundary.

R—19 inches; fractured andesite bedrock; clay coatings along fractures; few very fine roots in fractures.

The thickness of the solum and the depth to bedrock is 14 to 20 inches.

The B2t horizon is clay loam and clay. It is 60 to 80 percent angular cobbles and pebbles.

Minneha Series

The Minneha series consists of shallow, somewhat excessively drained soils on slopes of mountains. These soils formed in the residuum of granitic rock. Permeability is moderately rapid. Slope ranges from 50 to 75 percent.

Typical pedon of Minneha very gravelly sandy loam, 50 to 75 percent slopes, in an area of Minneha-Drit-Glean association; about 500 feet north and 500 feet west of the southeast corner sec. 12, T. 11 N., R. 22 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and common fine interstitial pores; 35 percent pebbles, 15 percent cobbles; slightly acid; abrupt smooth boundary.

A12—2 to 7 inches; brown (10YR 4/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and few very fine tubular pores; 50 percent pebbles; neutral; clear smooth boundary.

A13—7 to 14 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine tubular pores; 50 percent pebbles; neutral; clear smooth boundary.

C1—14 to 18 inches; brown (10YR 5/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine tubular pores; 50 percent pebbles; mildly alkaline; clear smooth boundary.

C2r—18 to 20 inches; weathered granodioritic bedrock; few very fine roots along weak fracture planes.

The thickness of the mollic epipedon is 11 to 18 inches. Depth to the paralithic contact ranges from 13 to 20 inches. Average rock fragment of the particle size control section ranges from 35 to 60 percent, mainly fine pebbles.

The C horizon is very gravelly coarse sandy loam or very gravelly sandy loam.

Mottsville Series

The Mottsville series consists of very deep, excessively drained, rapidly permeable soils on alluvial fans and mountain toe slopes. These soils formed in alluvium derived from granitic rock. Slope ranges from 2 to 50 percent.

Typical pedon of Mottsville gravelly loamy coarse sand, 4 to 15 percent slopes; about 100 feet west and 50 feet south of the northwest corner sec. 36, R. 12 N., R. 19 E.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; common very fine roots; many fine interstitial pores; slightly acid; clear smooth boundary.

A12—5 to 10 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; common very fine roots; many fine interstitial pores; slightly acid; clear wavy boundary.

AC—10 to 18 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many fine interstitial pores; slightly acid; clear wavy boundary.

C1—18 to 30 inches; light brownish gray (10YR 6/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many fine interstitial pores; slightly acid; clear wavy boundary.

C2—30 to 60 inches; light brownish gray (10YR 6/2) gravelly coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many fine interstitial pores; neutral.

The pedon ranges from loamy coarse sand to sand throughout. Rock fragments range from 5 to 30 percent. Stones or boulders are on the surface of some pedons.

Nevador Series

The Nevador series consists of very deep, well drained, permeable soils on alluvial fans. These soils formed in alluvium derived from mixed sources of rock. Permeability is moderately slow. Slope ranges from 0 to 8 percent.

Typical pedon of Nevador fine sandy loam, 0 to 2 percent slopes; about 1,300 feet west and 1,200 feet south of the northwest corner sec. 17, T. 13 N., R. 21 E.

A11—0 to 1 inch; light brownish gray (10YR 6/2) loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; neutral; abrupt smooth boundary.

A12—1 to 4 inches; light brownish gray (10YR 6/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; neutral; abrupt smooth boundary.

B1t—4 to 9 inches; pale brown (10YR 6/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse angular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; few thin clay films coating sand grains and lining pores; neutral; clear smooth boundary.

B2t—9 to 24 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure; hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; many thin clay films coating sand grains and ped faces; mildy alkaline; clear smooth boundary.

C1si—24 to 35 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; common very fine tubular pores; 25 percent hard firm durinodes; mildly alkaline; clear smooth boundary.

C2si—35 to 60 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and very fine roots; common very fine tubular pores; few hard firm durinodes; moderately alkaline.

The thickness of the solum is 14 to 24 inches.

The A horizon has subangular blocky or platy structure or is single grain. The Bt horizon is loam or clay loam and has blocky or prismatic structure. The Csi horizon is at a depth of 20 to 34 inches. It is 20 to 50 percent hard, firm durinodes.

Nevador Variant

The Nevador Variant consists of moderately deep, well drained soils on alluvial fans. These soils formed in alluvium weathered from Tertiary mudstone. Permeability is moderately slow. Slope ranges from 0 to 15 percent.

Typical pedon Nevador Variant fine sandy loam, 0 to 4 percent slopes; about 1,800 feet west and 1,000 feet south of the northeast corner sec. 21, T. 12 N., R. 21 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin and medium platy structure; soft,

very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and tubular pores; 15 percent gravel; few fine rounded slightly effervescent lime masses; moderately alkaline; abrupt wavy boundary.

A12—2 to 8 inches; grayish brown (10YR 5/2) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B2t—8 to 10 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak fine prismatic structure; hard, friable, slightly sticky and plastic; common very fine to coarse roots; many very interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles; common thin clay films on ped faces; strongly effervescent; moderately alkaline; clear smooth boundary.

B3t—10 to 20 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium and coarse prismatic structure; hard, friable, slightly sticky and slightly plastic; common very fine and few fine, medium, and coarse roots; common very fine and fine interstitial and tubular pores; 25 percent pebbles; violently effervescent; few thin clay films coating ped faces; mildly alkaline; clear smooth boundary.

C1ca—20 to 22 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; 20 percent pebbles; few fine lime filaments; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2sicam—22 to 60 inches; indurated duripan with thin continuous silica laminae; violently effervescent.

The thickness of the solum is 19 to 30 inches. Depth to the duripan is 21 to 34 inches.

The Bt horizon is gravelly loam or gravelly clay loam. It is 15 to 35 percent rock fragments, mainly pebbles. The upper part of the B2t horizon is effervescent in some pedons. The C horizon is sandy loam to loam.

Niwot Series

The Niwot series consists of very deep, poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium derived dominantly from granite. Slope is 0 to 2 percent.

Typical pedon of Niwot loam; about 1,000 feet east and 700 feet south of the west quarter corner sec. 7, T. 12 N., R. 20 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; weak medium to fine granular structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and common fine tubular pores; many interstitial pores; neutral; abrupt smooth boundary.

A1—6 to 15 inches; dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; common to many distinct grayish brown (2.5Y 5/2) and dark brown (10YR 4/3) moist mottles; massive; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and common fine tubular pores; neutral; abrupt smooth boundary.

C—15 to 60 inches; dominantly grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) stratified sand and gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; few fine roots in the uppermost part; many fine and very fine interstitial pores; neutral.

The thickness of the mollic epipedon is 7 to 18 inches, depending on the amount of land leveling that has taken place.

The C horizon is stratified fine sand to gravelly very coarse sand.

Nosrac Series

The Nosrac series consists of very deep, well drained soils on foothills and slopes of mountains. These soils formed in residuum and colluvium weathered from andesite. Permeability is moderately slow. Slope ranges from 8 to 50 percent.

Typical pedon of Nosrac stony clay loam, 30 to 50 percent slopes, in an area of Oppio-Nosrac association; about 1,900 feet east and 1,900 feet south of the northwest corner sec. 33, T. 12 N., R. 21 E.

A11—0 to 8 inches; dark grayish brown (10YR 4/2) stony clay loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, sticky and plastic; many very fine and common fine and few medium roots; many very fine interstitial pores; 1 percent stones, 25 percent pebbles; neutral; clear smooth boundary.

A12—8 to 14 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine and medium, and few coarse roots; many very fine and fine tubular pores; 45 percent pebbles, 10 percent cobbles; neutral; clear wavy boundary.

B21t—14 to 35 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine

and medium roots; many very fine and few fine tubular pores; continuous thin clay films on ped faces and lining pores; 35 percent pebbles and 10 percent cobbles; neutral; clear wavy boundary.

B22t—35 to 45 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, very friable, sticky and plastic; few very fine and fine roots; common very fine and few fine tubular pores; common thin clay films on ped faces and lining pores; 30 percent pebbles, 10 percent cobbles; neutral; clear wavy boundary.

B3t—45 to 60 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, sticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; few thin clay films on ped faces and lining pores; 20 percent pebbles, 10 percent cobbles; neutral.

The thickness of the mollic epipedon is 14 to 20 inches. The solum is more than 50 inches thick. Depth to bedrock is 60 to 80 inches. The particle size control section is 30 to 50 percent pebbles and 5 to 15 percent cobbles.

Olac Series

The Olac series consists of shallow and very shallow, well drained, moderately permeable soils on low hills and mountains. These soils formed in the residuum of andesite, rhyolite, basalt, and welded conglomerate rock. Slope ranges from 30 to 75 percent.

Typical pedon of Olac very stony loam, 30 to 50 percent slopes, in an area of Olac-Ister-Rock outcrop association; about 1,000 feet south and 150 feet west of the northeast corner sec. 13, T. 10 N., R. 23 E.

A11—0 to 2 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; few very fine tubular pores; 30 percent pebbles, 20 percent cobbles; mildly alkaline; abrupt smooth boundary.

A12—2 to 3 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; strong thick platy structure; slightly hard, very friable, sticky and plastic; common very fine roots; many very fine vesicular pores; 35 percent pebbles; mildly alkaline; abrupt wavy boundary.

B2t—3 to 10 inches; very pale brown (10YR 7/3) extremely gravelly loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine to medium roots; common very fine tubular pores; few thin clay films coating ped faces and lining pores; 60 percent pebbles; mildly alkaline; abrupt irregular boundary.

R—10 inches; fractured andesite bedrock.

The thickness of the solum and depth ranges from 8 to 14 inches. Average rock fragments in the particle size control section is 35 to 60 percent.

The B horizon is extremely gravelly loam and extremely gravelly clay loam and is 60 to 75 percent pebbles.

Ophir Series

The Ophir series consists of very deep, poorly drained, rapidly permeable soils in sloughs and on alluvial fans. These soils formed in mixed alluvium mainly derived from granite. Slope is 0 to 8 percent.

Typical pedon of Ophir gravelly sandy loam, 2 to 8 percent slopes; about 1,200 feet south and 400 feet east of the northwest corner sec. 14, T. 12 N., R. 19 E.

Ap—0 to 10 inches; dark gray (10YR 4/1) gravelly sandy loam, black (10YR 2/1) moist; few fine distinct brown (7.5YR 4/3) iron mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many fine interstitial pores; neutral; clear smooth boundary.

A12—10 to 13 inches; dark gray (10YR 4/1) gravelly loamy coarse sand, black (10YR 2/1) moist; few fine distinct brown (7.5YR 4/3) iron mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and fine interstitial pores; neutral; gradual smooth boundary.

A13—13 to 30 inches; dark gray (10YR 4/1) gravelly sandy loam, black (10YR 2/1) moist; common distinct dark brown (10YR 4/3) iron mottles; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; neutral; gradual smooth boundary.

C1—30 to 45 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark gray (10YR 3/1) moist; many coarse distinct brown (7.5YR 4/4) mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; neutral; diffused boundary.

C2—45 to 60 inches; grayish brown (2.5Y 5/2) gravelly loamy sand, very dark grayish brown (2.5Y 3/2) moist; many coarse distinct brown (10YR 4/3) mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; neutral.

The thickness of the mollic epipedon is 10 to 23 inches. The particle size control section is stratified sand, coarse sand, loamy coarse sand, loamy sand, loamy fine sand, and sandy loam. The average texture is loamy sand or coarse loamy sand. Gravel dominantly

less than 3/4 inch in diameter ranges from 5 to 30 percent. Common to many silica flakes are throughout the pedon. Distinct or prominent mottles are in the lower part of the epipedon or immediately below it.

Ophir Variant

The Ophir Variant consists of very deep, very poorly drained soils on alluvial fans. These soils formed in alluvium derived from granite. Permeability is moderately rapid. Slope is 0 to 8 percent.

Typical pedon of Ophir Variant peat, 2 to 4 percent slopes; about 2,200 feet west and 150 feet south of the northwest corner sec. 23, T. 12 N., R. 19 E.

O1—0 to 7 inches; very dark gray (10YR 3/1) peat, black (10YR 2/1) moist; slightly acid; abrupt smooth boundary.

A11—7 to 17 inches; dark gray (10YR 4/1) gravelly sandy loam, black (10YR 2/1) moist; few fine distinct brown (7.5YR 4/3) iron mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and fine interstitial pores; slightly acid; gradual smooth boundary.

A12—17 to 36 inches; dark gray (10YR 4/1) stratified gravelly loamy sand and sandy loam, black (10YR 2/1) moist; common medium distinct dark brown (10YR 4/3) iron mottles; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; slightly acid; gradual smooth boundary.

C1—36 to 45 inches; grayish brown (10YR 5/2) stratified coarse sand and gravelly sandy loam, very dark gray (10YR 3/1) moist; many coarse distinct brown (7.5YR 4/4) iron mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; neutral; diffused boundary.

C2—45 to 60 inches; grayish brown (2.5Y 5/2) stratified coarse sand and gravelly sandy loam, very dark grayish brown (2.5Y 3/2) moist; many coarse distinct dark brown (10YR 4/3) iron mottles; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; neutral.

The thickness of the O horizon ranges from 6 to 8 inches. The C horizon is stratified coarse sand, loamy sand, and sandy loam and may be gravelly in any strata.

Oppio Series

The Oppio series consists of moderately deep, well drained, slowly permeable soils on slopes of mountains. These soils formed in the residuum of andesite. Slope ranges from 30 to 50 percent.

Typical pedon of Oppio very stony fine sandy loam, 30 to 50 percent slopes, in an area of Oppio-Nosrac association; about 2,000 feet south and 1,500 feet west of the northeast corner sec. 15, T. 14 N., R. 21 E.

A11—0 to 3 inches; light brownish gray (10YR 6/2) very stony fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; few very fine to coarse vesicular pores; 20 percent stones, 10 percent cobbles, 10 percent pebbles; mildly alkaline; abrupt smooth boundary.

A12—3 to 5 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; strong very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; many very fine interstitial pores; 20 percent cobbles; mildly alkaline; abrupt wavy boundary.

B1t—5 to 8 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine to coarse roots; common very fine and fine and few medium tubular pores; continuous thin clay films coating ped faces and lining pores; 30 percent pebbles; mildly alkaline; abrupt wavy boundary.

B2t—8 to 30 inches; pale brown (10YR 6/3) gravelly clay, dark brown (10YR 4/3) moist; strong medium and coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine to medium roots; few very fine and fine tubular pores; continuous moderately thick clay films coating ped faces and lining pores; 15 percent pebbles; mildly alkaline; abrupt irregular boundary.

R—30 inches; andesitic bedrock.

The thickness of the solum and depth to bedrock is 20 to 40 inches. The upper few inches of the bedrock is weathered or fractured in some pedons.

Ormsby Series

The Ormsby series consists of very deep, somewhat poorly drained soils on flood plains and terraces. These soils formed in mixed alluvium derived from granite, andesite, and rhyolite. Permeability is moderately rapid. Slope is 0 to 2 percent.

Typical pedon of Ormsby gravelly loamy coarse sand; about 1,000 feet north and 75 feet west of the south quarter corner sec. 6, T. 13 N., R. 20 E.

Ap—0 to 7 inches; dark gray (10YR 4/1) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; weak medium and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many

very fine and few fine roots; common fine and very fine tubular and common fine and very fine interstitial pores; about 30 percent pebbles; mildly alkaline; abrupt smooth boundary.

A1—7 to 16 inches; dark grayish brown (10YR 4/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine and many very fine roots; few very fine and fine tubular and common fine and very fine interstitial pores; 30 percent pebbles; moderately alkaline; gradual smooth boundary.

C1—16 to 24 inches; grayish brown (10YR 5/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; massive; hard, very friable, nonsticky and nonplastic; few fine and many very fine roots; common very fine interstitial and few fine and very fine tubular pores; 20 percent pebbles; moderately alkaline; clear wavy boundary.

C2si—24 to 35 inches; brown (10YR 5/3) weakly silica-cemented gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; common fine and medium faint dark brown (7.5YR 3/2) moist iron mottles; massive; very hard, firm, brittle; common very fine roots; few very fine and fine interstitial pores; 25 percent pebbles; mildly alkaline; clear wavy boundary.

C3si—35 to 44 inches; light brownish gray (10YR 6/2) weakly silica-cemented gravelly coarse sand, dark grayish brown (10YR 4/2); moist; common medium faint very dark grayish brown (10YR 3/2) moist iron mottles; massive; very hard, firm, brittle; few very fine roots; few very fine and fine interstitial pores; 30 percent pebbles; mildly alkaline; clear wavy boundary.

C4si—44 to 52 inches; light brownish gray (10YR 6/2) weakly silica-cemented gravelly coarse sand, dark grayish brown (10YR 4/2) moist; common coarse faint very dark grayish brown (10YR 3/2) moist iron mottles; massive; hard, friable, slightly brittle; common very fine and fine interstitial pores; 35 percent pebbles; mildly alkaline; clear wavy boundary.

C5—52 to 60 inches; pale brown (10YR 6/3) very gravelly coarse sand, dark grayish brown (10YR 4/2) moist; few coarse faint very dark grayish brown (10YR 3/2) moist iron mottles; single grain; loose, nonsticky and nonplastic; many very fine interstitial pores; 40 percent pebbles; mildly alkaline.

The content of organic matter is less than 1 percent below a depth of 3 inches. The Csi horizon is calcareous in some pedons. The depth to the weakly silica-cemented Csi horizon ranges from 18 to 26 inches, and the degree of cementation is weak to very weak. The depth to mottles caused by iron content ranges from 24 to 36 inches depending on fluctuation of the water table.

Perazzo Series

The Perazzo series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Permeability is moderately slow. Slope is 2 to 8 percent.

Typical pedon of Perazzo gravelly loam, 2 to 8 percent slopes; about 500 feet east and 250 feet south of the northwest corner sec. 16, T. 13 N., R. 24 E.

A11—0 to 2 inches; light gray (10YR 7/2) gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular and vesicular pores; 15 percent pebbles; mildly alkaline; abrupt smooth boundary.

A12—2 to 4 inches; pale brown (10YR 6/3) gravelly fine sandy loam, brown (10YR 3/3) moist; strong coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; 15 percent pebbles; mildly alkaline; clear smooth boundary.

B21t—4 to 8 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine and medium roots; common very fine and few fine tubular pores; continuous thin clay films on ped faces and lining pores; 25 percent pebbles; lime coatings on the underside of gravel; mildly alkaline; clear smooth boundary.

B22tca—8 to 15 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and few fine tubular pores; continuous thin clay films coating ped faces and in pores; 50 percent pebbles; lime coatings on the underside of pebbles; strongly effervescent; mildly alkaline; clear smooth boundary.

C1ca—15 to 32 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; lime coatings on the underside of pebbles; strongly effervescent; 70 percent pebbles; mildly alkaline; clear smooth boundary.

IIC2ca—32 to 60 inches; brown (10YR 5/3) extremely gravelly loamy sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; lime coatings on the underside of pebbles; strongly effervescent; 75 percent pebbles; moderately alkaline.

The thickness of the solum ranges from 12 to 20 inches.

The B2t horizon is gravelly clay loam and gravelly sandy clay loam in the upper part and very gravelly sandy clay loam or very gravelly clay loam in the lower part and averages 45 to 60 percent pebbles. The lower part is slightly effervescent or strongly effervescent in most pedons.

Pernty Series

The Pernty series consists of shallow, well drained soils on slopes and ridges of mountains. These soils formed in the residuum of metavolcanic rock and rhyolite and andesite. Permeability is moderately slow. Slope ranges from 8 to 75 percent.

Typical pedon of Pernty very stony loam, 50 to 75 percent slopes, in an area of Pernty-Burnborough Glean association; 2,200 feet south and 1,500 feet west of the northeast corner sec. 13, T. 10. N., R. 21 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; 10 percent stones, 25 percent pebbles; neutral; abrupt smooth boundary.

A12—2 to 4 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine tubular pores; 50 percent pebbles; neutral; abrupt smooth boundary.

B1t—4 to 9 inches; grayish brown (10YR 5/2) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and plastic; many thin clay films coating ped faces; common very fine and fine and few coarse roots; common very fine and few fine tubular pores; 50 percent pebbles; neutral; abrupt irregular boundary.

B21t—9 to 15 inches; dark yellowish brown (10YR 4/4) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; continuous thin clay films coating ped faces; few very fine to medium roots; common very fine and few fine tubular pores; 50 percent pebbles; neutral; abrupt irregular boundary.

B22t—15 to 19 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate very fine and fine angular blocky structure; slightly hard, very friable, sticky and plastic; many moderately thick clay films coating ped faces; few very fine to medium roots; few very fine tubular pores; 50 percent angular cobbles and pebbles; neutral; very abrupt irregular boundary.

R—19 inches; andesite.

The thickness of the mollic epipedon is 7 to 10 inches. The solum thickness and depth to lithic contact is 14 to 20 inches. The argillic horizon is 25 to 35 percent clay and 35 to 50 percent rock fragments.

Phing Series

The Phing series consists of very deep, well drained, slowly permeable soils on alluvial fan remnants and dissected terraces. These soils formed in mixed alluvium. Slope ranges from 0 to 30 percent.

Typical pedon of Phing cobbly sandy loam, 4 to 15 percent slopes; about 2,100 feet north of the southwest corner sec. 8, T. 12 N., R. 21 E.

A1—0 to 4 inches; grayish brown (10YR 5/2) cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; few very fine and fine tubular and many very fine interstitial pores; about 20 percent cobbles; neutral; abrupt wavy boundary.

A2—4 to 9 inches; light gray (10YR 7/1) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate very thin platy structure; hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine interstitial and few very fine tubular pores; about 20 percent pebbles, 10 percent cobbles; mildly alkaline; abrupt wavy boundary.

B21t—9 to 19 inches; brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure; very hard, very firm, very sticky and very plastic; few fine and very fine roots; few very fine exped pores; continuous moderately thick clay films on ped faces, lining pores, and coating and bridging sand grains; about 5 percent pebbles, 2 percent cobbles; mildly alkaline; clear wavy boundary.

B22t—19 to 26 inches; brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine exped pores; continuous moderately thick clay films on ped faces, lining pores, and coating and bridging sand grains; 5 percent pebbles, 2 percent cobbles; few fine lime concretions; moderately alkaline; clear wavy boundary.

B3t—26 to 31 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; hard, very friable, sticky and plastic; common very fine exped pores; few thin clay films coating ped faces, lining pores, and bridging sand grains; few large black (10YR

2/1) manganese concretions; moderately alkaline; clear wavy boundary.

C1si—31 to 47 inches; light yellowish brown (10YR 6/4) weakly silica-cemented clay, dark yellowish brown (10YR 4/4) moist; weak fine angular blocky structure; hard, firm, brittle, slightly sticky and slightly plastic; few very fine exped pores; mildly alkaline; clear wavy boundary.

C2si—47 to 60 inches; brown (10YR 5/3) silty clay loam, dark yellowish brown (10YR 4/4) moist; weak fine angular blocky structure; hard, firm, brittle, slightly sticky and slightly plastic; common silica coatings on ped faces; mildly alkaline.

The thickness of the solum and depth to the Csi horizon is 20 to 40 inches. The B2t horizon is 40 to 60 percent clay. The C horizon is loam, clay loam, silty clay loam, or clay and is less than 20 percent pebbles.

Phing Variant

The Phing Variant consists of moderately deep, well drained, very slowly permeable soils on alluvial fans and pediments. These soils formed in alluvium weathered from mixed sources of rock. Slope ranges from 2 to 30 percent.

Typical pedon of Phing Variant extremely gravelly sandy loam, 2 to 8 percent slopes, in an area of Phing Variant-Reno association; about 1,200 feet east and 1,000 feet south of the northwest corner sec. 17, T. 13 N., R. 23 E.

A11—0 to 1 inch; brown (10YR 5/3) extremely gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; 60 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; abrupt wavy boundary.

A12—1 to 3 inches; light gray (10YR 7/2) very gravelly sandy loam, dark brown (10YR 3/3) moist; strong very coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 45 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

A13—3 to 5 inches; pale brown (10YR 6/3) very gravelly loam, very dark grayish brown (10YR 3/3) moist; strong fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine vesicular and common very fine tubular pores; 30 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

B1—5 to 9 inches; light gray (10YR 7/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/3) moist; strong coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; 20 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

B21t—9 to 11 inches; dark brown (7.5YR 4/4) clay, brown (7.5YR 4/4) moist; strong medium columnar structure; very hard, firm, very sticky and very plastic; few very fine to medium roots; common very fine tubular pores; continuous moderately thick pressure faces; 5 percent pebbles; mildly alkaline; abrupt smooth boundary.

B22t—11 to 18 inches; strong brown (7.5YR 5/6) clay, brown (7.5YR 5/4) moist; strong fine and medium prismatic structure; very hard, firm, very sticky and very plastic; few fine roots; common very fine tubular pores; continuous moderately thick pressure faces; 5 percent pebbles; mildly alkaline; clear smooth boundary.

B3tca—18 to 23 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; strong medium angular blocky structure; slightly hard, friable, sticky and plastic; few fine roots; common very fine tubular pores; common thin clay films on ped faces and lining pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—23 to 27 inches; pink (7.5YR 8/4) loam, brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and plastic; few very fine tubular pores; violently effervescent; moderately alkaline; very abrupt smooth boundary.

C2sicam—27 to 36 inches; very pale brown (10YR 8/3) indurated duripan; continuous thin silica laminae.

The thickness of the solum ranges from 20 to 36 inches. Depth to the indurated duripan is 20 to 40 inches.

The B2t horizon is 45 to 60 percent clay. Exchangeable sodium is 15 to 25 percent.

Prey Series

The Prey series consists of moderately deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived mainly from granite, but minor amounts were derived from other igneous rock and gneiss. Permeability is moderately rapid. Slope ranges 0 to 15 percent.

Typical pedon of Prey gravelly loamy sand, 0 to 4 percent slopes; about 1,100 feet east and 2,200 feet north of the south quarter corner sec. 6, T. 14. N., R. 20 E.

A11—0 to 2 inches; light gray (10YR 7/2) gravelly sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 15 percent pebbles; slightly acid; abrupt smooth boundary.

A12—2 to 5 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2)

moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and common fine tubular and many very fine and fine interstitial pores; 15 percent pebbles; slightly acid; abrupt wavy boundary.

A13—5 to 13 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine medium roots; many very fine and fine interstitial pores; 15 percent pebbles; slightly acid; clear wavy boundary.

B1t—13 to 16 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; common thin clay bridges between sand grains; 15 percent pebbles; slightly acid; clear smooth boundary.

B21t—16 to 20 inches; yellowish brown (10YR 5/4) coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; many thin clay bridges between sand grains; 10 percent pebbles; slightly acid; clear smooth boundary.

B22t—20 to 26 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; continuous thin clay films coating and bridging sand grains; 15 percent pebbles; slightly acid; abrupt irregular boundary.

B3t—26 to 30 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, yellowish brown (10YR 5/6) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; few moderately thick clay films bridging sand grains; 15 percent pebbles; neutral; abrupt wavy boundary.

C1sim—30 to 35 inches; very pale brown (10YR 7/3) strongly cemented duripan, dark brown (10YR 4/3) moist; massive; hard, very firm, brittle, discontinuous silica laminae 1/32 to 1/8 inch thick; few very fine and fine roots between laminae; mildly alkaline; clear smooth boundary.

C2si—35 to 52 inches; light gray (10YR 7/2) weakly silica-cemented loamy coarse sand, brown (10YR 5/3) moist; massive; very hard, firm, nonsticky and nonplastic; few very fine and fine tubular pores; 10 percent pebbles; mildly alkaline; clear smooth boundary.

C3—52 to 60 inches; very pale brown (10YR 7/3) loamy coarse sand, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine interstitial pores; mildly alkaline.

The thickness of the solum and depth to the strongly cemented duripan is 26 to 38 inches.

The B2t horizon has prismatic and subangular blocky structure or is massive. It is mainly less than 20 percent pebbles, but the content of pebbles ranges from 5 to 25 percent. The silica-cemented plates or bands in the Csim horizon range from few to many and from 1/64 to 1/8 inch in thickness.

Prey Variant

The Prey Variant consists of shallow, well drained, moderately permeable soils on high dissected terraces. These soils formed in alluvium derived mainly from granite, gneiss, and slate. Slope ranges from 2 to 15 percent.

Typical pedon of Prey Variant stony loam, 2 to 15 percent slopes; about 400 feet west and 810 feet south of the east quarter corner sec. 14, T. 14 N., R. 19 E.

A11—0 to 1 inch; brown (10YR 5/3) stony sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; few fine and many very fine roots; many very fine and fine interstitial pores; 15 percent stones and pebbles; slightly acid; abrupt smooth boundary.

A12—1 to 3 inches; grayish brown (10YR 5/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few medium, common fine, and many very fine roots; many very fine and fine interstitial pores; 25 percent pebbles, 20 percent cobbles, 2 percent stones; neutral; abrupt smooth boundary.

A13—3 to 10 inches; grayish brown (10YR 5/2) very cobbly loam, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; few medium, common fine, and many very fine roots; few very fine and fine tubular and many very fine interstitial pores; 25 percent pebbles, 20 percent cobbles, 2 percent stones; neutral; abrupt wavy boundary.

B1t—10 to 13 inches; brown (10YR 5/3) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, sticky and plastic; few fine and common very fine roots; common very fine and fine interstitial and few very fine tubular pores; many thin dark brown (10YR 4/3) clay bridges between sand grains and clay films lining pores; 20 percent pebbles; slightly acid; abrupt wavy boundary.

B2t—13 to 15 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 4/3) moist; few large prominent

dark reddish brown (5YR 2/2) iron and manganese stains; massive; very hard, friable, sticky and plastic; few fine and many very fine roots; common very fine and fine tubular pores; many moderately thick clay bridges between sand grains and moderately thick continuous clay films lining pores; 25 percent pebbles; slightly acid; abrupt wavy boundary.

C1sim—15 to 18 inches; brown (10YR 6/4) indurated duripan, dark brown (10YR 4/3) moist; massive; many very fine roots along continuous silica laminae; moderately thick continuous dark yellowish brown (10YR 3/4) clay films on silica laminae; neutral; abrupt wavy boundary.

C2sim—18 to 22 inches; light yellowish brown (10YR 6/4) indurated duripan, dark brown (10YR 4/3) moist; few large prominent dark reddish brown (5YR 3/4) iron stains; massive; very few very fine roots along silica laminae; 40 percent very strongly weathered pebbles and stones; mildly alkaline; gradual smooth boundary.

C3si—22 to 36 inches; pale brown (10YR 6/3) weakly silica-cemented gravelly fine sandy loam, dark brown (10YR 4/3) moist; massive; very hard, very firm, nonsticky and nonplastic; 30 percent pebbles; mildly alkaline; gradual smooth boundary.

C4si—36 to 60 inches; light yellowish brown (10YR 6/4) weakly silica-cemented very gravelly sandy loam, dark brown (10YR 4/3) moist; massive; very hard, firm, nonsticky and nonplastic; few very fine interstitial pores; 50 percent very strongly weathered pebbles and cobbles; mildly alkaline.

The thickness of the solum and depth to the duripan is 14 to 20 inches.

The A horizon has platy structure or is massive. The B2t horizon ranges from loam to sandy clay loam. In some pedons it has weak or moderate prismatic structure that parts to moderate or strong subangular blocky. The C horizon is very fine sandy loam or fine sandy loam. Most pebbles, cobbles, and stones in the C horizon are very highly weathered. The Csim horizon contains several very thin, less than 1/8 inch, continuous silica laminae. The material between alternating indurated layers is strongly silica cemented.

Puett Series

The Puett series consists of shallow, well drained soils on side slopes of low hills and terraces. These soils formed in the residuum of mudstone and siltstone. Permeability is moderately rapid. Slope ranges from 15 to 50 percent.

Typical pedon of Puett gravelly fine sandy loam, 15 to 30 percent slopes, in an area of Indian Creek Variant-Cassiro-Puett association; about 660 feet west and 1,700 feet south of the northeast corner sec. 19, T. 12 N., R. 21 E.

A1—0 to 3 inches; light brownish gray (10YR 6/2) gravelly fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 15 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1—3 to 13 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C2r—13 to 17 inches; gray (10YR 6/1) soft weathered mudstone, gray (10YR 5/1) moist; massive; few medium roots along fracture planes; violently effervescent along fracture planes.

The depth to the paralithic contact is 10 to 20 inches.

Puett Variant

Puett Variant consists of moderately deep, well drained soils on old dissected terraces. These soils formed in alluvium derived from siltstone and mudstone. Permeability is moderately rapid. Slope ranges from 15 to 30 percent.

Typical pedon of Puett Variant very gravelly loam, 15 to 30 percent slopes, in an area of Kram-Puett Variant association; about 1,000 feet east and 1,500 feet south of the northwest corner of sec. 36, T. 12 N., R. 21 E.

A11—0 to 2 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 50 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

A12—2 to 8 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and coarse roots; common very fine tubular pores; 25 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C—8 to 28 inches; pale brown (10YR 6/3) very gravelly fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium and common coarse roots; common very fine tubular pores; 45 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

Cr—28 inches; soft weathered mudstone.

The depth to the paralithic contact is 24 to 40 inches. The pedon is sandy loam, fine sandy loam, and loam that is 45 to 65 percent pebbles.

Pula Series

The Pula series consists of very deep, well drained, slowly permeable soils on side slopes of terraces. These soils formed in alluvium and colluvium weathered from mixed sources of rock. Slope ranges from 15 to 50 percent.

Typical pedon of Pula very cobbly loam, 15 to 30 percent slopes, in an area of Pula-Nosrac-Pung association; about 520 feet east and 1,560 feet north of the southwest corner sec. 28, T. 13 N., R. 22 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very cobbly fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine tubular pores; 25 percent pebbles, 30 percent cobbles; slightly acid; abrupt smooth boundary.

A12—2 to 5 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine, common medium, and few coarse roots; many very fine tubular pores; 30 percent pebbles; neutral; abrupt wavy boundary.

B1t—5 to 9 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine and fine and common medium and coarse roots; many very fine tubular pores; common thin clay films coating and bridging sand grains on ped faces and lining pores; 40 percent pebbles; neutral; abrupt wavy boundary.

B21t—9 to 13 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine to medium and few coarse roots; many very fine tubular pores; common moderately thick clay films on ped faces; 45 percent pebbles; neutral; abrupt wavy boundary.

B22t—13 to 17 inches; brown (10YR 5/3) extremely gravelly clay, dark brown (10YR 4/3) moist; moderate coarse prismatic structure parting to coarse angular blocky; very hard, very firm, very sticky and very plastic; common very fine and fine and few medium roots; common very fine tubular pores; continuous moderately thick clay films on ped faces; 70 percent pebbles; neutral; clear wavy boundary.

B23t—17 to 22 inches; brown (10YR 5/3) extremely gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; common moderately thick clay films coating and bridging sand grains; 70 percent pebbles; neutral; clear wavy boundary.

B3t—22 to 30 inches; pale brown (10YR 6/3) extremely gravelly sandy clay loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and plastic; few fine roots; few very fine tubular pores; common thin clay films coating and bridging sand grains; 70 percent pebbles; neutral; gradual wavy boundary.

C—30 to 60 inches; white (10YR 8/2) extremely gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; 75 percent pebbles; neutral.

The thickness of the solum is 22 to 40 inches.

The Bt horizon is very gravelly or extremely gravelly heavy clay loam, clay, and sandy clay.

Pulcan Series

The Pulcan series consists of moderately deep, well drained, slowly permeable soils on side slopes of dissected terraces. These soils formed in residuum and colluvium weathered from mudstone, sandstone, and interbedded tuffs. Slope ranges from 15 to 30 percent.

Typical pedon of Pulcan very gravelly fine sandy loam, 15 to 30 percent slopes, in an area of Pulcan-Puett-Uhaldi association; about 120 feet southwest of the east quarter corner sec. 28, T. 10 N., R. 23 E.

A11—0 to 2 inches; brown (10YR 5/3) very gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine and medium roots; many very fine and few very fine tubular pores; 40 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; abrupt wavy boundary.

A12—2 to 5 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine and medium roots; many very fine tubular and few fine interstitial pores; 40 percent pebbles, 5 percent cobbles; neutral; abrupt wavy boundary.

B21t—5 to 9 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; dark brown (10YR 3/3) coating on ped faces; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many very fine, common fine, and few medium and coarse roots; many very fine tubular pores; many moderately thick clay films on ped

faces and coating sand grains; 40 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

B22t—9 to 18 inches; brown (7.5YR 5/4) very gravelly sandy clay, dark brown (7.5YR 4/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; many very fine and few fine to coarse roots; many very fine tubular pores; continuous moderately thick clay films on ped faces and lining pores; 45 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

B3t—18 to 25 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and few medium and fine roots; many very fine tubular pores; common moderately thick clay films coating and bridging sand grains; 45 percent pebbles, 5 percent cobbles; mildly alkaline; abrupt wavy boundary.

C1ca—25 to 34 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; many very fine tubular pores; 45 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2r—34 inches; soft weathered mudstone; violently effervescent along fracture planes.

The depth to paralithic contact is 28 to 40 inches. The particle size control section is 35 to 45 percent clay and 35 to 60 percent rock fragments. Fragments are mainly pebbles and some cobbles.

The A horizon in some pedons is as much as 15 percent cobbles on the surface. The B horizon is very gravelly sandy clay loam, very gravelly clay loam, very gravelly sandy clay, and very gravelly clay. The C horizon is very gravelly sandy loam and very gravelly loamy sand.

Pung Series

The Pung series consists of very deep, well drained, slowly permeable soils on side slopes of dissected terraces. These soils formed in alluvium weathered from Tertiary sediment. Slope ranges from 8 to 30 percent.

Typical pedon of Pung stony loam, 15 to 30 percent slopes, in an area of Pung-Phing-Chalco association; about 500 feet south and 400 feet west of the northeast corner sec. 27, T. 13 N., R. 22 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial pores; 25 percent pebbles, 10 percent stones; neutral; abrupt wavy boundary.

A12—2 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine tubular pores; 10 percent pebbles; neutral; abrupt wavy boundary.

B21t—6 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; many very fine and fine, and few medium roots; many very fine tubular pores; common moderately thick clay films coating and bridging sand grains; 10 percent pebbles; neutral; abrupt wavy boundary.

B22t—11 to 22 inches; yellowish brown (10YR 5/4) clay, yellowish brown (10YR 5/6) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; many very fine and fine and common medium and coarse roots; common very fine tubular pores; continuous pressure faces; neutral; clear wavy boundary.

B23t—22 to 30 inches; light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/6) moist; weak coarse prismatic structure parting to strong coarse subangular blocky; hard, firm, sticky and plastic; common very fine to medium roots; many very fine tubular pores; many moderately thick clay films on ped faces; neutral; gradual wavy boundary.

C1si—30 to 40 inches; very pale brown (10YR 7/4) loam, dark yellowish brown (10YR 4/4) moist; strong fine angular blocky structure; hard, brittle, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; silica coating on ped faces; 75 percent discontinuous weakly silica cemented; 10 percent pebbles; mildly alkaline; gradual wavy boundary.

C2sica—40 to 60 inches; very pale brown (10YR 8/3) sandy loam, yellowish brown (10YR 5/6) moist; strong fine angular blocky structure; hard, brittle, nonsticky and nonplastic; few very fine roots; very few tubular pores; 80 percent discontinuous silica cemented; noneffervescent matrix with strongly effervescent common soft lime masses on ped faces; mildly alkaline.

The thickness of the mollic epipedon is 10 to 15 inches. The solum thickness is 28 to 38 inches. The particle size control section averages 40 to 60 percent clay.

The B2t horizon is clay with clay loam common in the upper part of some pedons. Texture of the B2t horizon is modified with 0 to 15 percent pebbles. The C horizon is loam and sandy loam modified with 5 to 15 percent pebbles.

Rawe Series

The Rawe series consists of very deep, well drained, slowly permeable soils on alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Slope ranges from 2 to 15 percent.

Typical pedon of Rawe gravelly sandy loam, 4 to 15 percent slopes; about 500 feet east and 100 feet north of the assumed southwest corner sec. 20, T. 14 N., R. 24 E.

A11—0 to 2 inches; light gray (10YR 7/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; strong thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine vesicular pores; 15 percent pebbles; moderately alkaline; abrupt smooth boundary.

A12—2 to 5 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; weak very thin platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few medium roots; many very fine tubular pores; 5 percent pebbles; moderately alkaline; abrupt smooth boundary.

B1t—5 to 8 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; weak medium angular blocky structure parting to strong very fine granular; soft, very friable, very sticky and very plastic; common very fine roots; common very fine tubular pores; common thin clay films coating ped faces; 5 percent pebbles; moderately alkaline; clear smooth boundary.

B2t—8 to 15 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; hard, firm, very sticky and very plastic; common very fine and few fine exped roots; few very fine exped pores; continuous thin clay films coating ped faces; 30 percent pebbles; mildly alkaline; clear smooth boundary.

B3t—15 to 23 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium angular blocky structure; hard, firm, sticky and plastic; no roots or pores observed; common thin clay films coating ped faces; 30 percent pebbles; mildly alkaline; clear smooth boundary.

IIC1ca—23 to 33 inches; lightly yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, nonsticky and nonplastic; 40 percent pebbles; lime coats on underside of some pebbles; few very weak durinodes; strongly effervescent; moderately alkaline; clear wavy boundary.

IIC2ca—33 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 40 percent pebbles; lime coats on underside of gravel; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 15 to 23 inches.

Average texture of the B2t horizon is gravelly clay that is 40 to 50 percent clay and 15 to 25 percent pebbles. The C horizon is 35 to 75 percent rock fragments, mainly pebbles.

Reno Series

The Reno series consists of moderately deep, well drained, very slowly permeable soils on alluvial fans, terraces, and pediments. These soils formed in alluvium derived from mixed sources of rock. Slope ranges from 0 to 15 percent.

Typical pedon of Reno gravelly sandy loam, 2 to 8 percent slopes; about 600 feet north and 900 feet west of the southeast corner sec. 2, T. 12 N., R. 20 E.

A1—0 to 1 inch; light brownish gray (10YR 6/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; slightly acid; abrupt smooth boundary.

A2—1 to 2 inches; light gray (10YR 7/2) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine and few fine roots; common fine and many very fine vesicular pores; many clean sand grains; slightly acid; abrupt smooth boundary.

A&B—2 to 3 inches; light brownish gray (10YR 6/2) sandy clay loam, dark brown (10YR 3/3) moist; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine roots; many very fine interstitial pores; many clean sand grains; common thin clay films on surfaces of peds; slightly acid; abrupt broken boundary.

B&A—3 to 5 inches; grayish brown (10YR 5/2) sandy clay loam, dark brown (10YR 3/3) moist; weak medium columnar structure parting to strong very fine subangular blocky; slightly hard, friable, sticky and plastic; few fine and many very fine roots; many very fine tubular pores; thin continuous clay films lining pores and on faces of peds; slightly acid; very abrupt wavy boundary.

B21t—5 to 15 inches; dark brown (10YR 4/3) sandy clay, dark yellowish brown (10YR 3/4) moist; strong medium columnar structure; extremely hard, very firm, very sticky and very plastic; common very fine and few fine roots; few very fine tubular and interstitial pores; many slickensides and pressure cutans; neutral; clear smooth boundary.

B22t—15 to 19 inches; dark brown (10YR 4/3) sandy clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium prismatic structure parting to strong coarse angular blocky; extremely hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular and interstitial pores; continuous moderately thick clay films on faces of peds and lining pores; neutral; clear wavy boundary.

IIB3t—19 to 24 inches; pale brown (10YR 6/3) very gravelly light sandy clay loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular and common very fine interstitial pores; continuous thin and moderately thick clay films on ped faces and lining pores; 40 percent pebbles; neutral; clear wavy boundary.

IIC1—24 to 32 inches; light yellowish brown (10YR 6/4) very gravelly coarse sand, dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 40 percent pebbles; neutral; abrupt wavy boundary.

IIIC2sicam—32 to 44 inches; very pale brown (10YR 8/3) indurated duripan, light yellowish brown (10YR 6/4) moist; massive; very hard to extremely hard, very firm; few very fine roots along fractures; few very fine interstitial pores; many thin discontinuous silica laminae; thin continuous silica films lining pores and common thin silica bridges between sand grains; white (10YR 8/2) lime coats; very firm; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIIC3—44 to 60 inches; pale brown (10YR 6/3) very gravelly loamy sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; slightly effervescent; white (10YR 8/2) lime coats on undersides of some pebbles; 40 percent pebbles; moderately alkaline.

The thickness of the solum ranges from 20 to 36 inches, and depth to the duripan is 20 to 40 inches.

The A horizon has platy, granular, subangular blocky structure or is massive or single grain. The B2t horizon is sandy clay or clay that averages 35 to 60 percent clay. It has columnar or prismatic structure parting to angular or subangular blocky. The lower part of the B2t horizon is massive in some pedons. Pebbles, cobbles, and stones range to 20 percent in the upper part of the solum. In the lower part of the B horizon and in the C horizon rock fragments range from 30 to 70 percent. The duripan is immediately below the solum or the C or IIC horizon.

Risue Series

The Risue series consists of shallow, well drained, slowly permeable soils on alluvial fans. These soils formed in alluvium derived from basic igneous rock. Slope ranges from 0 to 15 percent.

Typical pedon of Risue gravelly loam, 0 to 8 percent slopes; about 1,400 feet south and 2,000 feet west of the assumed northeast corner sec. 20, T. 14 N., R. 24 E.

A11—0 to 1 inch; light brownish gray (10YR 6/2) very gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine interstitial pores; 50 percent pebbles; mildly alkaline; abrupt smooth boundary.

A12—1 to 5 inches; light brownish gray (10YR 6/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate very thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine to medium vesicular pores; 20 percent pebbles; mildly alkaline; abrupt smooth boundary.

B21t—5 to 6 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 4/3) moist; moderate very fine angular blocky structure; slightly hard, very friable, sticky and plastic; common very fine to medium roots; common very fine and fine tubular pores; 15 percent pebbles; moderately alkaline; abrupt wavy boundary.

B22t—6 to 15 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong coarse prismatic structure; hard, firm, very sticky and very plastic; common very fine to medium roots; few very fine exped tubular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

B3t—15 to 18 inches; brown (7.5YR 5/4) gravelly clay loam, dark brown (7.5YR 4/4) moist; moderate medium and fine angular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; few very fine tubular pores; 25 percent pebbles, 5 percent cobbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Csicam—18 to 60 inches; light gray (10YR 7/2) indurated duripan; massive; extremely hard, extremely firm; very thin silica laminae; few very fine roots along fracture planes.

The thickness of the solum and depth to the indurated duripan is 12 to 20 inches.

The A horizon generally has a thin very gravelly loamy sand surface layer less than 2 inches thick. The B2t horizon is clay loam, clay, or gravelly clay. The C horizon is indurated in the upper 10 to 20 inches. The lower part is noncemented to strongly silica cemented.

Roloc Series

The Roloc series consists of shallow, well drained, moderately permeable soils on mountain slopes and

ridges. These soils formed in the residuum of granite. Slope ranges from 15 to 75 percent.

Typical pedon of Roloc gravelly sandy loam, 15 to 50 percent slopes, in an area of Trid-Roloc-Drit association; about 500 feet east of the northwest corner sec. 19, T. 14 N., R. 23 E.

O1—1 inch to 0; pine needle mat.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine tubular pores; 20 percent pebbles; neutral; abrupt smooth boundary.

A12—3 to 9 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine tubular pores; 10 percent pebbles; neutral; abrupt smooth boundary.

A3—9 to 11 inches; brown (10YR 5/3) very gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few very fine tubular pores; 40 percent pebbles; neutral; abrupt smooth boundary.

B2t—11 to 16 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine to medium roots; common very fine and few medium tubular pores; common thin clay films coating sand grains; 45 percent pebbles; neutral; abrupt smooth boundary.

B3t—16 to 18 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium roots; common very fine tubular pores; few thin clay films coating sand grains and lining pores; 40 percent pebbles; neutral; abrupt wavy boundary.

Cr—18 inches; partially weathered granitic bedrock, with clay films coating fracture planes.

The thickness of the mollic epipedon is 7 to 12 inches. The solum thickness and depth to the paralithic contact is 14 to 20 inches.

The A horizon is 10 to 50 percent pebbles. A few stones are in this horizon in some pedons. The B2t horizon is coarse sandy loam or loam that is 35 to 50 percent pebbles.

Saralegui Series

The Saralegui series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived dominantly from granite, but some material is derived from sedimentary and volcanic rocks. Permeability is moderately rapid. Slope ranges from 0 to 8 percent.

Typical pedon of Saralegui sand, 2 to 8 percent slopes; about 50 feet north and 20 feet east of the south quarter corner sec. 16, T. 14 N., R. 20 E.

A11—0 to 3 inches; pale brown (10YR 6/3) sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; slightly acid; abrupt smooth boundary.

A12—3 to 11 inches; grayish brown (10YR 5/2) loamy sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and common very fine and fine tubular pores; neutral; clear smooth boundary.

B1t—11 to 16 inches; grayish brown (10YR 5/2) gravelly sandy loam, brown (10YR 4/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine and few fine tubular pores; thin clay films on sand grains; 25 percent pebbles; neutral; clear smooth boundary.

B21t—16 to 20 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; extremely hard, firm, sticky and plastic; common very fine and fine roots; many very fine and common tubular pores; common thin clay bridges between sand grains; thin continuous clay films lining pores; 25 percent pebbles; neutral; clear wavy boundary.

B22t—20 to 28 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, sticky and slightly plastic; few very fine and fine roots; few very fine and fine interstitial pores; few thin clay bridges between sand grains; 10 percent pebbles; neutral; clear wavy boundary.

C1—28 to 34 inches; pale brown (10YR 6/3) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; neutral; clear wavy boundary.

C2—34 to 60 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral.

The thickness of the solum is 22 to 33 inches.

The upper 7 inches of the A horizon when mixed has an average value of 6, dry. The Bt horizon is gravelly sandy loam, sandy loam, or coarse sandy loam, and in some pedons is as much as 25 percent pebbles and cobbles. The C horizon is sandy loam, loamy sand, or sand.

Searles Series

The Searles series consists of moderately deep, well drained soils on slopes of mountains. These soils formed in residuum and colluvium weathered from rhyolite. Permeability is slow. Slope ranges from 30 to 50 percent.

Typical pedon of Searles very stony loam, 30 to 50 percent slopes, in an area of Searles-Burnborough-Duco association; about 1,100 feet west and 2,080 feet north of the southeast corner sec. 23, T. 13 N., R. 22 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 45 percent pebbles, 5 percent cobbles and stones; neutral; abrupt wavy boundary.

A12—2 to 6 inches; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 40 percent pebbles; neutral; clear wavy boundary.

B21t—6 to 9 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and plastic; many very fine and common fine roots; many very fine tubular pores; common thin clay films bridging sand grains; 50 percent pebbles; neutral; clear wavy boundary.

B22t—9 to 21 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; common thin clay films bridging and coating sand grains; 50 percent pebbles; neutral; gradual wavy boundary.

B23t—21 to 36 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; common moderately thick clay films coating and bridging sand grains; 50 percent pebbles; neutral; abrupt wavy boundary.

R—36 inches; rhyolite.

The thickness of the solum and depth to bedrock is 20 to 40 inches.

The B2t horizon is sandy clay loam and clay loam that is 50 to 65 percent rock fragments, mainly pebbles.

Settlemeyer Series

The Settlemeyer series consists of very deep, poorly drained soils on flood plains. These soils formed in alluvium derived from mixed sources of rock including granitic and basic rock. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical pedon of Settlemeyer clay loam; about 1,100 feet west and 1,100 feet south of the northeast corner sec. 14, T. 13 N., R. 19 E.

A11—0 to 5 inches; dark gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; strong fine and medium granular structure; hard, friable, sticky and plastic; many very fine and common fine roots; many very fine and fine interstitial pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

A12—5 to 15 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak medium prismatic structure; hard, friable, sticky and plastic; many very fine and common fine roots; few very fine and fine tubular and common very fine interstitial pores; many worm casts; common fine prominent white (10YR 8/2) lime filaments; strongly effervescent; strongly alkaline; clear wavy boundary.

AC—15 to 22 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; massive; hard, friable, sticky and plastic; common very fine and fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; common worm casts; few fine prominent white (10YR 8/1) lime filaments; strongly effervescent; moderately alkaline; gradual wavy boundary.

C1—22 to 35 inches; light brownish gray (2.5Y 6/2) silty clay loam, olive gray (5Y 4/2) moist; common fine distinct brown (10YR 5/3) iron mottles; massive; hard, friable, sticky and plastic; many very fine and fine roots; many very fine and few fine tubular pores; common worm casts; moderately alkaline; abrupt wavy boundary.

C2—35 to 41 inches; olive gray (5Y 5/2) loam, olive gray (5Y 4/2) moist; common fine distinct dark brown (10YR 4/3) iron mottles; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; moderately alkaline; gradual wavy boundary.

C3—41 to 60 inches; olive gray (5Y 5/2) fine sandy loam, olive gray (5Y 4/2) moist; many fine medium and coarse dark brown (10YR 3/3) iron mottles; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; mildly alkaline.

The A1 horizon is weakly effervescent to violently effervescent, but is noneffervescent in the lower part in some pedons. The C horizon is dominantly sandy clay

loam, clay loam, or silty clay loam but has common thin strata of fine sandy loam, sandy loam, loamy fine sand, and sand. A nonconforming layer of gravel is at a depth of more than 42 inches in some pedons. In some pedons, the underlying material is dense clay.

Shakespeare Series

The Shakespeare series consists of very deep, somewhat poorly drained, slowly permeable soils on short side slopes of mountains. These soils formed in colluvium derived from undifferentiated metavolcanic rock. Slope ranges from 8 to 50 percent.

Typical pedon of Shakespeare gravelly loam, 8 to 30 percent slopes; about 2,200 feet west and 2,200 feet south of the northeast corner sec. 30, T. 14 N., R. 19 E.

O1—1 inch to 0; pine needle litter.

A11—0 to 3 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and few fine tubular pores; 30 percent pebbles; slightly acid; abrupt smooth boundary.

A12—3 to 6 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and medium roots; common very fine tubular pores; 25 percent pebbles; medium acid; abrupt smooth boundary.

B2t—6 to 15 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common fine to coarse roots; common very fine tubular pores; common thin clay films on ped faces and coating sand grains; 55 percent pebbles; medium acid; abrupt wavy boundary.

B31t—15 to 29 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common medium and coarse roots; many very fine and common fine tubular pores; few thin clay films on ped faces and lining pores; 50 percent pebbles; medium acid; clear smooth boundary.

B32t—29 to 37 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common medium roots; common very fine tubular pores; few thin clay films on ped faces and lining pores; 55 percent pebbles; medium acid; abrupt wavy boundary.

A2b—37 to 44 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; few very fine tubular pores; 40 percent pebbles; medium acid; abrupt wavy boundary.

B2tb—44 to 60 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist inped, brown (7.5YR 4/4) moist exped clay films; weak medium and coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine and few fine tubular pores; many moderately thick clay films on ped faces and lining pores; 30 percent pebbles; neutral.

The thickness of the solum is 30 to 45 inches. Depth to bedrock is more than 60 inches. The particle size control section is 35 to 50 percent rock fragments, predominantly pebbles and cobbles.

The B2t horizon is very gravelly or very cobbly loam or clay loam. Buried A and B2t horizons are common below a depth of 33 inches.

These Shakespeare soils are taxadjuncts to the Shakespeare series because they have an umbric epipedon and have slightly less clay in the B2t horizon than is normal for the series.

Shalcar Family

The Shalcar family consists of very deep, very poorly drained, moderately permeable soils in concave depressional areas. These soils formed in decomposed organic material derived from plant remains over moderately fine textured alluvium. Slope is 0 to 2 percent.

Representative pedon of Shalcar family peat; about 3,040 feet north and 660 feet west of the southeast corner sec. 23, T. 12 N., R. 19 E.

Oil—0 to 6 inches; very dark gray (10YR 3/1) peat, black (10YR 2/1) moist; slightly acid; abrupt smooth boundary.

Oal—6 to 24 inches; gray (10YR 5/1) muck and silt loam layers 1/8 to 2 inches thick, very dark gray (10YR 3/1) moist; mineral part massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine tubular and many micro to very fine interstitial pores; neutral; abrupt smooth boundary.

C1g—24 to 30 inches; light olive gray (5Y 6/2) sandy clay loam, olive gray (5Y 4/2) moist; many medium and coarse faint olive (5Y 5/6) mottles; massive; hard, friable, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; slightly acid; abrupt wavy boundary.

IIC2g—30 to 66 inches; light gray (5Y 6/1) gravelly loamy coarse sand, olive gray (5Y 4/2) moist; a few gray (5Y 5/1) loamy coarse sand strata 2 to 4 inches thick; many medium and coarse prominent yellowish brown (10YR 5/4) iron mottles; massive;

slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine tubular pores; slightly acid.

The O horizon is 17 to 36 inches thick. The underlying mineral material is mainly sandy clay loam or clay loam overlying loamy coarse sand. The boundary between the loamy and sandy material ranges from abrupt to gradual.

Shree Series

The Shree series consists of very deep, well drained soils on alluvial fans. These soils formed in gravelly alluvium weathered from mixed sources of rock. Permeability is moderately slow. Slope ranges from 2 to 15 percent.

Typical pedon of Shree very gravelly fine sandy loam, 2 to 8 percent slopes, in an area of Shree-Settlemeyer association; 500 feet west and 1,500 feet north of the southeast corner sec. 33, T. 14 N., R. 22 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) very gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 45 percent pebbles; neutral; abrupt smooth boundary.

A12—1 to 3 inches; grayish brown (10YR 5/2) very gravelly loam, dark grayish brown (10YR 3/2) moist; moderate medium subangular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; 40 percent pebbles; neutral; abrupt smooth boundary.

A13—3 to 7 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; 40 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

B1t—7 to 12 inches; brown (10YR 5/3) extremely gravelly loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine and few fine pores; many thin clay films coating ped faces; 50 percent pebbles, 10 percent cobbles; neutral; abrupt wavy boundary.

B2t—12 to 21 inches; yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine and fine tubular pores; many thin clay films coating ped faces; 50 percent pebbles, 10 percent cobbles; neutral; clear wavy boundary.

B3t—21 to 26 inches; yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; 50 percent pebbles, 10 percent cobbles; neutral; clear wavy boundary.

C—26 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; 60 percent pebbles, 15 percent cobbles; mildly alkaline.

The thickness of the mollic epipedon is 10 to 15 inches. The solum is 24 to 36 inches.

The B2t horizon is clay loam or sandy clay loam that is 40 to 65 percent rock fragments, mainly pebbles but including some cobbles and stones. The C horizon is loam, fine sandy loam, or sandy loam that is 40 to 65 percent rock fragments, mainly pebbles but including some cobbles and stones.

Softscrabble Series

Softscrabble series consists of very deep, well drained, slowly permeable soils on slopes of mountains. These soils formed in residuum and colluvium weathered from metavolcanic rock. Slope ranges from 30 to 50 percent.

Typical pedon of Softscrabble extremely cobbly loam, 30 to 50 percent slopes, in an area of Softscrabble-Glean-Genoa association; about 500 feet south and 2,000 feet east of the northwest corner sec. 26, T. 11 N., R. 22 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) extremely cobbly loam, very dark brown (10YR 2/2) moist; moderate coarse subangular blocky structure; few very fine roots; common very fine tubular pores; 40 percent pebbles, 20 percent cobbles; neutral; clear smooth boundary.

A12—4 to 7 inches; grayish brown (10YR 5/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; 50 percent pebbles; neutral; clear wavy boundary.

A13—7 to 14 inches; dark grayish brown (10YR 4/2) extremely gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; many very fine and few fine and medium tubular pores; 60 percent pebbles, 10 percent cobbles; neutral; clear wavy boundary.

B2t—14 to 27 inches; brown (10YR 5/3) extremely gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine to coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine to medium roots; many very fine and few fine and medium tubular pores; many thin clay films coating ped faces and sand grains; 60 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

B3t—27 to 60 inches; dark brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; many thin clay films coating sand grains; 55 percent pebbles; neutral.

The thickness of the mollic epipedon is 24 to 28 inches. The solum thickness is 60 to 80 inches. The Bt horizon is 35 to 65 percent rock fragments.

Springmeyer Series

The Springmeyer series consists of very deep, well drained soil on alluvial fans and terraces. These soils formed in alluvium weathered from mixed sources of rock. Permeability is moderately slow. Slope ranges from 2 to 50 percent.

Typical pedon of Springmeyer gravelly fine sandy loam, 4 to 15 percent slopes; about 500 feet west and 300 feet south of the northwest corner sec. 10, T. 11 N., R. 20 E.

A11—0 to 3 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; moderate thick platy structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine vesicular pores; 25 percent pebbles, 1 percent cobbles; neutral; abrupt smooth boundary.

A12—3 to 10 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak medium and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 25 percent pebbles; neutral; clear wavy boundary.

B1t—10 to 16 inches; brown (10YR 5/3) gravelly light sandy clay loam, dark brown (10YR 3/3) moist; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine and fine tubular pores; few thin clay films on ped faces and lining pores; 20 percent pebbles; neutral; clear wavy boundary.

B2t—16 to 22 inches; brown (10YR 5/3) gravelly heavy sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; moderately thick clay films on ped faces and in pores; 20 percent pebbles; slightly acid; clear wavy boundary.

C—22 to 60 inches; pale brown (10YR 6/3) gravelly sandy clay loam, dark brown (10YR 4/3) moist; many fine and few medium distinct yellowish brown (10YR 5/6) and reddish brown (5YR 5/4) iron mottles; weak medium and fine subangular blocky structure in upper part and massive in the lower part; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; few thin clay films on some ped faces in the upper part; 30 percent pebbles; neutral.

The thickness of the solum ranges from 20 to 28 inches. The content of pebbles ranges from 20 to 35 percent throughout the pedon. In some pedons, scattered stones are in the A horizon and some cobbles and stones are the B and C horizons.

The B2t horizon is sandy clay loam or clay loam. It has prismatic or subangular blocky structure.

Stodick Series

The Stodick series consists of shallow, well drained soils on foothills. These soils formed in residuum and mixed alluvium weathered from andesite, basalt, rhyolite, granite, and sandstone. Permeability is moderately slow. Slope ranges from 4 to 50 percent.

Typical pedon of Stodick very stony fine sandy loam, 4 to 15 percent slopes; about 2,400 feet east of the north quarter corner sec. 35, T. 14 N., R. 20 E.

A1—0 to 3 inches; pale brown (10YR 6/3) very stony fine sandy loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine and few fine roots; many fine and very fine vesicular pores; neutral; abrupt wavy boundary.

B1t—3 to 5 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak fine and very fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; many very fine and fine interstitial pores; few thin clay films on faces of peds and coating and bridging sand grains; few bleached sand grains at the top of horizon; 10 percent pebbles; neutral; abrupt wavy boundary.

B2t—5 to 10 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine angular and subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine and few medium and coarse roots along ped surfaces in the upper part; few very fine tubular and interstitial pores; few moderately thick

dark brown (7.5YR 3/4) clay films on ped faces and lining pores; 35 percent pebbles; neutral; gradual wavy boundary.

IIB3t—10 to 18 inches; pale olive (5Y 6/3) very gravelly loam, olive (5Y 5/3) moist; massive; hard, firm and friable, sticky and plastic; many fine and very fine, and few medium roots; few fine tubular pores; common thin dark brown (7.5YR 4/3) clay films lining pores, coating pebbles, and bridging sand grains; 40 percent pebbles and 10 percent cobbles; neutral; clear wavy boundary.

IICr—18 inches; gray (5Y 6/1) weathered conglomerate, olive (5Y 4/3) moist; parts to thick plates; discontinuous clay films along cleavage planes. The bedrock consists of softly consolidated tuff and conglomerate with visible crystals of mica, hornblende, and quartz sand grains.

The thickness of the solum and depth to underlying bedrock ranges from 14 to 20 inches. In most pedons, a gravelly pavement that has a faint coating of desert varnish covers 50 to 60 percent of the surface.

The B2t horizon is 35 to 50 percent pebbles. It commonly is 0 to 10 percent cobbles but is as much as 40 percent cobbles in some subhorizons. The IIB3t horizon has yellowish hue that has been inherited from the underlying bedrock.

Stucky Series

The Stucky series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived mainly from granitic rock. Permeability is moderately slow. Slope ranges from 8 to 30 percent.

Typical pedon of Stucky extremely cobbly sandy loam, 8 to 15 percent slopes; 1,700 feet south and 500 feet west of the northeast corner sec. 32, T. 13 N., R. 23 E.

A11—0 to 5 inches; light brownish gray (10YR 6/2) extremely cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine vesicular pores; 40 percent cobbles, 25 percent pebbles; neutral; abrupt smooth boundary.

A12—5 to 8 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; few very fine tubular pores; 30 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

B1t—8 to 14 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, pale brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common thin clay bridges on sand grains; 35 percent pebbles, 30 percent cobbles; neutral; abrupt smooth boundary.

B2t—14 to 21 inches; brown (10YR 5/3) very cobbly sandy clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; continuous thin clay films on ped faces and lining pores; 30 percent pebbles, 20 percent cobbles; neutral; clear wavy boundary.

B3t—21 to 28 inches; light yellowish brown (10YR 6/4) very cobbly sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; continuous thin clay films on ped faces and lining pores; 30 percent pebbles, 20 percent cobbles; neutral; abrupt wavy boundary.

B21tb—28 to 45 inches; brown (7.5YR 5/4) extremely cobbly sandy clay loam, dark brown (7.5YR 4/4) moist; strong medium and coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine exped tubular pores; continuous thin clay films coating ped faces and lining pores; 30 percent pebbles, 30 percent cobbles; neutral; clear smooth boundary.

B22tb—45 to 60 inches; light brown (7.5YR 6/4) extremely cobbly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine and tubular pores; continuous thin clay films coating ped faces; 35 percent pebbles, 30 percent cobbles; neutral.

The thickness of the solum is 20 to 30 inches. A buried argillic horizon is common in most pedons.

The B2t horizon is 40 to 70 percent pebbles, cobbles, and stones. The C horizon if present, is 40 to 75 percent rock fragments in some pedons. The buried B2t horizon is sandy clay loam, clay loam, or sandy loam that is 40 to 80 percent rock fragments.

Sup Series

The Sup series consists of very deep, well drained soils on mountain side slopes. These soils formed in colluvium weathered from granite and andesite. Permeability is moderately rapid. Slope ranges from 15 to 50 percent.

Typical pedon of Sup stony loam, 15 to 50 percent slopes, in an area of Glean-Sup-Genoa association; about 1,500 feet north and 750 feet west of the southeast corner sec. 35, T. 14 N., R. 22 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) stony loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly

hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine tubular pores; 2 percent stones, 5 percent cobbles, 20 percent pebbles; slightly acid; abrupt smooth boundary.

A12—2 to 6 inches; grayish brown (10YR 5/2) very gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine tubular pores; 30 percent pebbles, 15 percent cobbles; slightly acid; abrupt smooth boundary.

A13—6 to 12 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium; subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine, common fine and medium, and few coarse roots; many very fine and few medium and coarse tubular pores; 30 percent pebbles, 15 percent cobbles; slightly acid; abrupt irregular boundary.

C1—12 to 22 inches; pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, dark brown (7.5YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine to coarse roots; few very fine to medium tubular pores; 50 percent pebbles, 20 percent cobbles; medium acid; clear wavy boundary.

C2—22 to 31 inches; light brownish gray (10YR 6/3) extremely gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 50 percent pebbles, 25 percent cobbles; medium acid; abrupt wavy boundary.

C3—31 to 39 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 50 percent pebbles, 25 percent cobbles; medium acid; clear wavy boundary.

C4—39 to 60 inches; light brownish gray (10YR 6/2) very cobbly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 20 percent pebbles, 20 percent cobbles; medium acid.

The thickness of the mollic epipedon is 8 to 16 inches. The particle size control section is stratified very gravelly or extremely gravelly coarse sandy loam, sandy loam, fine sandy loam, or loam that is 45 to 75 percent rock fragments. The depth to bedrock is 60 to 80 inches.

Surgem Series

The Surgem series consists of moderately deep, well drained, slowly permeable soils on slopes of mountains. These soils formed in residuum weathered from granitic rock. Slope ranges from 30 to 50 percent.

Typical pedon of Surgem extremely stony sandy loam, 30 to 50 percent slopes, in an area of Surgem-Olac-Cagle association; about 1,700 feet east and 1,000 feet north of the southwest corner sec. 29, T. 13 N., R. 23 E.

A11—0 to 4 inches; light brownish gray (10YR 6/2) extremely stony sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine vesicular pores; 10 percent stones; neutral; abrupt smooth boundary.

A12—4 to 8 inches; brown (10YR 5/3) extremely cobbly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine vesicular pores; 35 percent pebbles, 25 percent cobbles; neutral; abrupt smooth boundary.

B1t—8 to 14 inches; brown (7.5YR 5/2) very cobbly sandy clay, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and few fine and medium roots; common very fine and few fine tubular pores; continuous thin clay films coating ped faces; 30 percent pebbles, 25 percent cobbles; neutral; abrupt smooth boundary.

B2t—14 to 24 inches; brown (7.5YR 5/3) very cobbly clay, dark brown (7.5YR 3/4) moist; strong medium and coarse subangular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; 55 percent pebbles and cobbles; mildly alkaline; very abrupt wavy boundary.

R—24 to 26 inches; fractured granite; clay coatings along fracture planes.

The thickness of the solum and the depth to bedrock is 20 to 30 inches.

The B2t horizon is dominantly clay or sandy clay, but sandy clay loam is common in some subhorizons. This horizon is 50 to 60 percent rock fragments.

Sutro Series

The Sutro series consists of moderately deep, well drained, moderately permeable soils on slopes of low hills. These soils formed in the residuum of metavolvanic rock. Slope ranges from 15 to 50 percent.

Typical pedon of Sutro very stony loam, 30 to 50 percent slopes, in an area of Koontz-Sutro complex, 30 to

50 percent slopes; about 1,500 feet north and 1,800 feet east of the southwest corner sec. 7, T. 19 N., R. 23 E.

A11—0 to 4 inches; brown (10YR 5/3) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine to coarse roots; common very fine tubular pores; 30 percent pebbles, 15 percent stones; neutral; clear smooth boundary.
A12—4 to 10 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine to coarse roots; common very fine and fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.
B2—10 to 19 inches; brown (10YR 4/3) gravelly loam, dark yellowish brown (10YR 3/4) moist; strong medium angular blocky structure; hard, firm, nonsticky and nonplastic; common very fine and fine, few medium, and common coarse roots; common very fine and fine tubular pores; 15 percent pebbles; neutral; clear wavy boundary.
C1—19 to 39 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark yellowish brown (10YR 3/4) moist; strong medium platy structure; very hard, firm, nonsticky and nonplastic; few very fine and fine and common medium roots; few very fine and fine and medium pores; 15 percent pebbles; neutral; clear wavy boundary.
C2r—39 to 43 inches; soft metavolcanic bedrock.

The thickness of the solum is 12 to 19 inches. Depth to metavolcanic bedrock is 20 to 40 inches.

The B2 horizon is loam or clay loam that is 15 to 35 percent rock fragments, mainly pebbles. The C horizon is loam or fine sandy loam that is 5 to 20 percent rock fragments, mainly pebbles.

Temo Series

The Temo series consists of very shallow and shallow, excessively drained, rapidly permeable soils on slopes of mountains. These soils formed in the residuum of granite. Slope ranges from 30 to 70 percent.

Typical pedon of Temo stony loamy coarse sand, 30 to 50 percent slopes, in an area of Temo-Rock outcrop complex, 30 to 50 percent slopes; about 500 feet south and 1,000 feet west of the northeast corner sec. 6, T. 13 N., R. 19 E.

O1—2 inches to 0; duff and pine needle litter.
A11—0 to 3 inches; dark grayish brown (10YR 4/2) stony loamy coarse sand, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine pores; 5 percent pebbles, 5 percent cobbles, 10 percent stones; slightly acid; abrupt wavy boundary.
A12—3 to 6 inches; grayish brown (10YR 5/2) coarse sand, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine pores; 5 percent pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.
C—6 to 9 inches; light brownish gray (10YR 6/2) gravelly coarse sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine to medium roots; many very fine pores; 10 percent pebbles, 5 percent cobbles; slightly acid; very abrupt boundary.
Cr—9 inches; weathered granite.

The depth to weathered bedrock ranges from 8 to 20 inches

The A horizon is 6 to 10 inches thick. The C horizon is loamy coarse sand or coarse sand that is 15 to 35 percent pebbles.

Theon Series

The Theon series consists of very shallow, well drained soils on low hills. These soils formed in the residuum of andesitic rock. Permeability is moderately slow. Slope ranges from 8 to 75 percent.

Typical pedon of Theon very gravelly loam, 15 to 50 percent slopes; about 2,300 feet east of the west quarter corner sec. 14, T. 13 N., R. 23 E.

A1—0 to 2 inches; light gray (10YR 7/2) very gravelly loam, dark brown (10YR 4/3) moist; weak thick platy structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and coarse vesicular pores; 50 percent pebbles; moderately alkaline; abrupt smooth boundary.
B1t—2 to 3 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; strong very fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; many very fine, common fine tubular pores; 55 percent pebbles; common thin clay films coating ped faces; neutral; abrupt wavy boundary.
B21t—3 to 8 inches; pale brown (10YR 6/3) very gravelly clay loam, dark brown (10YR 4/3) moist; strong very fine angular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; many very fine tubular pores; many thin clay films coating ped faces and rock fragments; 60 percent pebbles; neutral; clear wavy boundary.
B22t—8 to 13 inches; brown (7.5YR 5/4) very gravelly clay loam, dark reddish brown (7.5YR 4/4) moist; strong very fine angular blocky structure; hard, very friable, sticky and plastic; few very fine roots; few very fine tubular pores; many thin clay films coating

ped faces and rock fragments; 60 percent pebbles; neutral; clear wavy boundary.

C1—13 to 18 inches; weathered andesite.

R—18 to 36 inches; fractured bedrock.

The thickness of the solum and the depth to paralithic contact is 8 to 14 inches. Depth to the lithic contact is 10 to 20 inches.

The B2t horizon is very gravelly clay loam or very gravelly sandy clay loam. It is 35 to 60 percent rock fragments.

Toiyabe Series

The Toiyabe series consists of shallow, excessively drained, rapidly permeable soils on slopes and summits of mountains. These soils formed in the residuum of granite. Slope ranges from 4 to 75 percent.

Typical pedon of Toiyabe very stony loamy coarse sand, 30 to 50 percent slopes, in an area of Toiyabe-Rock outcrop complex, 30 to 50 percent slopes; about 800 feet south and 400 feet east of the north quarter corner sec. 28, T. 13 N., R. 19 E.

O—2 inches to 0; dark grayish brown (10YR 4/2) pine needles over partially decomposed needles, very dark grayish brown (10YR 3/2) moist, very dark brown (10YR 2/2) crushed; medium acid; abrupt smooth boundary.

A1—0 to 7 inches; dark gray (10YR 4/1) very stony loamy coarse sand, black (10YR 2/1) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine pores; 15 percent stones, 10 percent cobbles; medium acid; clear smooth boundary.

C1—7 to 15 inches; light brownish gray (2.5Y 6/2) gravelly loamy coarse sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many fine and few medium and coarse roots; many very fine and fine pores; 5 percent stones, 10 percent cobbles, 15 percent pebbles; medium acid; abrupt irregular boundary.

C2r—15 inches; decomposing gray and white granodiorite; many dark brown crystals of mica and other ferromagnesian minerals; original rock structure soft enough to dig with a tiling spade to a depth of about 4 feet.

The depth to paralithic contact ranges from 10 to 20 inches. The particle size control section is predominantly loamy coarse sand, but in some pedons it is sand, coarse sand, or very coarse sand that is less than 35 percent rock fragments.

Toll Series

The Toll series consists of very deep, somewhat excessively drained, rapidly permeable soils on alluvial fans and terraces. These soils formed in mixed alluvium derived dominantly from granite, but partly from other igneous, sedimentary, and metamorphic rocks. Slope ranges from 0 to 15 percent.

Typical pedon of Toll sand, 0 to 4 percent slopes; about 270 feet south and 50 feet west of the north quarter corner sec. 28, T. 14 N., R. 20 E.

A11—0 to 4 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; single

grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; slightly acid; clear smooth boundary.

A12—4 to 12 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.

C1—12 to 20 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial, and common very fine tubular pores; neutral; clear smooth boundary.

C2—20 to 54 inches; pale brown (10YR 6/3) loamy sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine and fine interstitial pores; neutral; clear smooth boundary.

C3—54 to 60 inches; pale brown (10YR 6/3) coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine interstitial pores; neutral.

The particle size control section averages to loamy sand. The A horizon is single grain or massive. Some areas are hummocky because of wind action. The C horizon is stratified loamy sand, sand, or coarse sand.

In some pedons, a clay layer is below a depth of 40 inches.

Trid Series

The Trid series consists of moderately deep, well drained soils on slopes of mountains. These soils formed in the residuum of granitic rock. Permeability is moderately slow. Slope ranges from 4 to 50 percent.

Typical pedon of Trid very stony fine sandy loam, 30 to 50 percent slopes, in an area of Trid-Roloc-Drit association; about 100 feet south of the north quarter corner sec. 20, T. 14 N., R. 22 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) very stony fine sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine vesicular pores; 35 percent pebbles, 10 percent cobbles, 10 percent stones; neutral; abrupt smooth boundary.

A12—1 to 3 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; 50 percent pebbles; neutral; abrupt smooth boundary.

A13—3 to 6 inches; dark grayish brown (10YR 4/2) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine to medium roots; many very fine, common fine, and few medium tubular pores; 65 percent pebbles; neutral; abrupt wavy boundary.

B21t—6 to 11 inches; brown (10YR 5/3) extremely gravelly clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, sticky and plastic; few very fine to medium roots; many very fine tubular pores; common thin clay films on ped faces and lining pores; 65 percent pebbles; neutral; clear smooth boundary.

B22t—11 to 20 inches; dark brown (7.5YR 4/4) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine to coarse roots; many very fine tubular pores; continuous thin clay films on ped faces and lining pores; 60 percent pebbles; neutral; clear smooth boundary.

B3t—20 to 34 inches; yellowish brown (10YR 5/4) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common thin clay films lining pores; 65 percent pebbles; neutral; clear smooth boundary.

Cr—34 inches; weathered granitic rock; clay films lining weak fracture planes.

The thickness of the mollic epipedon is 8 to 12 inches. The solum thickness and depth to paralithic contact is 20 to 40 inches. Rock fragments in the particle size control section range from 55 to 75 percent.

The B2t horizon is sandy clay loam or clay loam. Some pedons have a B3 horizon that is coarse sandy loam to loam.

Turria Series

The Turria series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived from mixed sources of rock. Permeability is moderately slow. Slope is 0 to 2 percent.

Typical pedon of Turria loam; about 1,300 feet south and 1,500 feet west of the northeast corner sec. 10, T. 13 N., R. 20 E.

A1—0 to 2 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and thin platy structure; slightly hard, friable, nonsticky and nonplastic; few fine and common very fine roots; many very fine and few fine vesicular pores; neutral; abrupt smooth boundary.

B21t—2 to 5 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak medium prismatic

structure parting to moderate thin platy; hard, friable, sticky and plastic; few fine and common very fine roots; few fine and very fine tubular and many very fine interstitial pores; few thin clay films on ped faces, many thin clay films lining pores; neutral; abrupt wavy boundary.

B22t—5 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; few fine and many very fine roots; few fine and common very fine tubular and few very fine interstitial pores; many thin clay films on ped faces, continuous thin clay films lining pores; neutral; abrupt wavy boundary.

B3t—9 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to weak medium platy; hard, friable, slightly sticky and slightly plastic; common fine and many very fine roots; common fine and many very fine tubular pores; common thin clay films on ped faces, continuous thin clay films lining pores; neutral; clear smooth boundary.

C1—12 to 20 inches; pale brown (10YR 6/3) light loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and many very fine roots; few fine and common very fine tubular pores; mildly alkaline; clear smooth boundary.

C2—20 to 32 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and common very fine roots; common fine and very fine tubular pores; mildly alkaline; clear smooth boundary.

C3—32 to 39 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and common very fine roots; common fine and very fine tubular pores; mildly alkaline; clear wavy boundary.

C4—39 to 44 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine and common very fine tubular pores; few fine soft masses of lime; slightly effervescent; moderately alkaline; clear smooth boundary.

C5—44 to 55 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine interstitial pores; slightly effervescent; moderately alkaline; clear smooth boundary.

C6—55 to 60 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and few fine tubular pores; few fine soft masses of lime; slightly effervescent; mildly alkaline.

The thickness of the solum is 12 to 20 inches. The depth to free carbonates is 30 to 40 inches.

The B2t horizon commonly has prismatic structure but is subangular blocky in some pedons. The C horizon is commonly stratified very fine sandy loam, loam, or silt loam but has strata of sandy loam to loamy sand below a depth of 40 inches in some pedons. The lower part of the C horzion has few or common, fine segregations of lime, or the lime is disseminated.

Uhaldi Series

The Uhaldi series consists of moderately deep, well drained soils on terraces and slopes of low hills. These soils formed in colluvium derived from mixed sources of rock, mainly Tertiary sediment. Permeability is moderately slow. Slope ranges from 15 to 50 percent.

Typical pedon of Uhaldi very stony loam, 15 to 30 percent slopes, in an area of Verdico-Uhaldi-Springmeyer association; about 1,500 feet north of the south quarter corner sec. 30, T. 14 N., R. 22 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 15 percent pebbles, 15 percent cobbles, 15 percent stones; medium acid; abrupt smooth boundary.

A12—1 to 2 inches; grayish brown (10YR 5/2) very gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong thick platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular and vesicular pores; 25 percent pebbles, 10 percent cobbles; slightly acid; abrupt smooth boundary.

A13—2 to 5 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 10 percent pebbles, 10 percent cobbles; slightly acid; clear wavy boundary.

B21t—5 to 8 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong medium and fine angular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine and medium roots; many very fine tubular pores; few thin clay films coating ped faces; 20 percent pebbles; slightly acid; clear smooth boundary.

B22t—8 to 16 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; strong coarse angular blocky structure; slightly hard, friable, sticky

and plastic; common very fine and few medium roots; many very fine tubular pores; continuous thin clay films coating ped faces; 15 percent pebbles; neutral; clear smooth boundary.

B3t—16 to 24 inches; pale brown (10YR 6/3) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine and few medium and coarse roots; common very fine tubular pores; 15 percent pebbles; slightly acid; abrupt wavy boundary.

Cr—24 inches; weathered tuffaceous sandstone.

The thickness of the mollic epipedon is 12 to 16 inches. The solum thickness and depth to the paralithic contact is 20 to 40 inches. The particle size control section is 27 to 35 percent clay that is 15 to 35 percent rock fragments, mainly pebbles.

Updike Series

The Updike series consists of very deep, moderately well drained, very slowly permeable soils on flood plains. These soils formed in mixed alluvium. Slope is 0 to 2 percent.

Typical pedon of Updike silty clay loam, strongly saline-alkali; about 1,100 feet west of the east quarter corner sec. 32, T. 13 N., R. 21 E.

A1—0 to 2 inches; light brownish gray (10YR 6/2) silty clay loam, brown (10YR 4/3) moist; strong very fine granular structure; soft, very friable, sticky and plastic; few fine roots; many very fine vesicular pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

B21t—2 to 6 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; strong medium prismatic structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; common fine and medium tubular pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

B22t—6 to 15 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; strong coarse prismatic structure; hard, friable, very sticky and very plastic; few very fine to medium roots; common fine and medium tubular pores; slightly effervescent; strongly alkaline; clear smooth boundary.

C1—15 to 41 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; massive; slightly hard, friable, very sticky and very plastic; few very fine and fine roots; few very fine and fine pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

IIC2—41 to 60 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; massive; loose; nonsticky and nonplastic; few very fine roots; few very fine and fine pores; slightly effervescent; moderately alkaline.

The thickness of the solum is 15 to 30 inches.

The C horizon is clay or sandy clay and commonly has strata of loamy sand below a depth of 40 inches.

Updike Variant

The Updike Variant consists of very deep, moderately well drained soils on flood plains and terraces. These soils formed in mixed alluvium. Permeability is moderately slow. Slope is less than 2 percent.

Typical pedon of Updike Variant loam; about 1,800 feet north and 2,840 feet east of the southwest corner sec. 5, T. 12 N., R. 21 E.

A1—0 to 1 inch; brown (10YR 5/3) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, very friable, nonsticky and nonplastic; common very fine roots; many very fine vesicular pores; moderately alkaline; abrupt wavy boundary.

A2—1 to 4 inches; light gray (10YR 7/1) loam, gray (10YR 5/1) moist; moderate very thin platy structure; slightly hard, friable, nonsticky and nonplastic; common very fine roots; many very fine vesicular pores; moderately alkaline; abrupt wavy boundary.

B21t—4 to 14 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse prismatic structure; hard, very firm, sticky and plastic; few very fine and fine roots; few very fine tubular and interstitial pores; common thin clay films on ped faces and lining pores; strongly alkaline; abrupt wavy boundary.

B22t—14 to 17 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; few very fine tubular and interstitial pores; common thin clay films on ped faces and lining pores; very strongly alkaline; abrupt smooth boundary.

B31tcs—17 to 41 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium angular blocky structure; hard, very friable, sticky and plastic; few fine roots; few very fine tubular and interstitial pores; many thin clay films on ped faces and lining pores; fine gypsum crystals in old root channels and pores; strongly alkaline; abrupt smooth boundary.

B32t—41 to 48 inches; light brownish gray (10YR 6/2) loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine tubular and interstitial pores; many thin clay films on ped faces and lining pores; very strongly alkaline; abrupt smooth boundary.

B33t—48 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly

plastic; few very fine tubular and common very fine interstitial pores; many thin clay films on ped faces and lining pores; very strongly alkaline.

The A horizon has platy structure, or it is massive. The B2t horizon is clay loam or loam that is 25 to 35 percent clay.

Verdico Series

The Verdico series consists of moderately deep, well drained, very slowly permeable soil on old terraces. These soils formed in alluvium weathered from mixed sources of rock. Slope ranges from 2 to 15 percent.

Typical pedon of Verdico gravelly loam, 4 to 8 percent slopes, in an area of Verdico-Uhaldi-Springmeyer association; about 1,000 feet south and 1,500 feet east of the northwest corner sec. 30, T. 14 N., R. 22 E.

A11—0 to 1 inch; light brownish gray (10YR 6/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine vesicular pores; 15 percent pebbles; slightly acid; abrupt wavy boundary.

A12—1 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine to medium roots; few very fine and fine tubular pores; 25 percent pebbles; slightly acid; abrupt wavy boundary.

B21t—4 to 12 inches; light brownish gray (10YR 6/2) clay, dark brown (10YR 4/3) moist; strong medium and coarse angular blocky structure; hard, friable, very sticky and very plastic; many fine and few medium roots; common very fine and few fine tubular pores; continuous thin clay films on ped faces; slightly acid; clear wavy boundary.

B22t—12 to 21 inches; pale brown (10YR 6/3) clay, dark brown (10YR 4/3) moist; strong coarse angular blocky structure; hard, friable, very sticky and very plastic; common medium and coarse and many fine roots; common very fine and fine tubular pores; continuous thin clay films on ped faces; neutral; clear wavy boundary.

C1—21 to 35 inches; very pale brown (10YR 7/4) clay, dark yellowish brown (10YR 4/4) moist; strong coarse angular blocky structure; hard, friable, sticky and plastic; few medium and coarse roots; few fine and medium tubular pores; neutral; clear wavy boundary.

C2r—35 to 60 inches; soft weathered mudstone.

The thickness of the solum is 20 to 30 inches. Depth to the paralithic contact is 20 to 40 inches. The B2t horizon is less than 10 percent rock fragments, mostly pebbles.

Veta Series

The Veta series consists of very deep, well drained soils on stream terraces and alluvial fans. These soils formed in alluvium weathered from mixed sources of rock. Permeability is moderately rapid. Slope is 2 to 4 percent.

Typical pedon of Veta very gravelly sandy loam, rarely flooded, 2 to 4 percent slopes; about 500 feet east and 500 feet north of the southwest corner sec. 8, T. 13 N., R. 24 E.

A1—0 to 3 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine tubular and vesicular pores; 40 percent pebbles; moderately alkaline; abrupt smooth boundary.

B2—3 to 18 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine tubular pores; 40 percent pebbles; moderately alkaline; clear smooth boundary.

C1—18 to 35 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 50 percent pebbles; mildly alkaline; clear smooth boundary.

C2ca—35 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam with thin strata of loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine tubular pores; 70 percent pebbles; lime coating underside of pebbles; moderately alkaline.

The thickness of the solum ranges from 12 to 20 inches. The particle size control section is fine sandy loam or sandy loam. It has thin strata of loamy sand and is 35 to 75 percent pebbles.

The C horizon is slightly effervescent to strongly effervescent in the lower part.

Vicee Series

The Vicee series consists of very deep, well drained, moderately permeable soils on slopes of mountains. These soils formed in residuum and colluvium weathered from metavolcanic rock. Slope ranges from 30 to 75 percent.

Typical pedon of Vicee gravelly very fine sandy loam, 50 to 75 percent slopes, in an area of Vicee-Rock

outcrop complex, 50 to 75 percent slopes; about 2,200 feet west and 300 feet south of the northeast corner sec. 21, T. 13 N., R. 19 E.

O1—2 inches to 0; pine needles.
A1—0 to 2 inches; gray (10YR 5/1) gravelly very fine sandy loam, very dark gray (10YR 3/1) moist; massive; loose, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.
A12—2 to 13 inches; gray (10YR 5/1) gravelly very fine sandy loam, very dark gray (10YR 3/1) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine to medium roots; common very fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.
C1—13 to 37 inches; light brownish gray (10YR 6/2) gravelly very fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; neutral; common very fine to medium roots; common very fine and fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.
C2—37 to 60 inches; light brownish gray (10YR 6/2) gravelly very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine to medium roots; common very fine and fine tubular pores; 15 percent pebbles, 5 percent cobbles; neutral.

The thickness of the mollic epipedon is 7 to 14 inches. Rock fragments consisting mainly of pebbles range from 15 to 20 percent in the particle size control section. Depth to bedrock is more than 60 inches.

The C horizon is very fine sandy loam or loam.

Vicee Variant

The Vicee Variant consists of moderately deep, well drained, moderately permeable soils on slopes of mountains. These soils formed in colluvium weathered from metavolcanic rock. Slope ranges from 4 to 75 percent.

Typical pedon of Vicee Variant extremely stony very fine sandy loam, 30 to 50 percent slopes, in an area of Vicee Variant-Rock outcrop complex, 30 to 50 percent slopes; about 1,000 feet north and 2,300 feet west of the southeast corner sec. 9, T. 19 N., R. 19 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) extremely stony very fine sandy loam, very dark gray (10YR 3/1) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine tubular pores; 10 percent stones; medium acid; abrupt smooth boundary.
A12—1 to 7 inches; grayish brown (10YR 5/2) very gravelly loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure parting to strong very fine granular; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; 25 percent pebbles, 10 percent cobbles; slightly acid; clear smooth boundary.
A13—7 to 14 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; 25 percent pebbles, 10 percent cobbles; slightly acid; clear irregular boundary.
B2—14 to 21 inches; yellowish brown (10YR 5/4) very cobbly loam, dark brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 20 percent pebbles, 35 percent cobbles; slightly acid; abrupt irregular boundary.
C—21 to 36 inches; light olive gray (5Y 6/2) very cobbly loam, olive gray (5Y 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 10 percent pebbles, 35 percent cobbles, 5 percent stones; neutral; abrupt irregular boundary.
R—36 to 40 inches, metavolcanic bedrock.

The depth to bedrock ranges from 24 to 40 inches. The particle size control section is dominantly loam but may range to very fine sandy loam or fine sandy loam. The content of rock fragments in the pedon ranges from 10 to 15 percent stones, 30 to 40 percent cobbles, and 20 to 35 percent pebbles.

The A horizon ranges from granular to subangular blocky in structure. The B2 horizon has weak or moderate, fine or medium subangular blocky structure.

Voltaire Series

The Voltaire series consists of very deep, poorly drained, slowly permeable soils on alluvial fans and flood plains. These soils formed in mixed alluvium. Slope is 0 to 2 percent.

Typical pedon of Voltaire clay, slightly saline-alkali; about 500 feet west and 250 feet south of the east quarter corner sec. 15, T. 13 N., R. 19 E.

A11—0 to 3 inches; dark gray (10YR 4/1) clay, very dark brown (10YR 2/2) moist; moderate medium subangular blocky and angular blocky structure; very hard, firm, very sticky and very plastic; many very fine and few fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline; clear smooth boundary.

A12—3 to 9 inches; gray (10YR 5/1) clay, very dark brown (10YR 2/2) moist; few fine prominent reddish brown (5YR 4/4) iron mottles; weak coarse prismatic structure; very hard, firm, very sticky and very plastic; common very fine and few fine roots; common very fine and few fine tubular pores; strongly effervescent; very strongly alkaline; abrupt wavy boundary.

A3—9 to 20 inches; gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; common medium faint dark grayish brown (2.5Y 4/2) and common fine distinct reddish brown (5YR 4/4) iron mottles; weak medium prismatic structure; very hard, friable, sticky and plastic; common very fine and few fine roots; many very fine and fine tubular pores; slightly effervescent; strongly alkaline; clear wavy boundary.

C1g—20 to 29 inches; olive gray (5Y 5/2) heavy loam, olive gray (5Y 4/2) moist; common fine and medium prominent yellowish brown (10YR 5/4) and few fine prominent reddish brown (5YR 4/4) iron mottles; many worm casts; weak medium prismatic structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; slightly effervescent; strongly alkaline; clear wavy boundary.

C2g—29 to 38 inches; olive gray (5Y 5/2) silty clay loam, olive gray (5Y 4/2) moist; common fine and medium prominent yellowish brown (10YR 5/4) and few fine prominent reddish brown (5YR 4/4) iron mottles; few worm casts; massive; hard, friable, very sticky and very plastic; common very fine and fine roots; many very fine tubular pores; slightly effervescent; strongly alkaline; clear wavy boundary.

C3g—38 to 45 inches; gray (5Y 5/1) silty clay loam, dark olive gray (5Y 3/2) moist; massive; hard, friable, sticky and plastic; many very fine and few fine roots; many very fine and fine tubular pores; few fine lime nodules as much as 1/8 inch in diameter; slightly effervescent; moderately alkaline; gradual wavy boundary.

C4g—45 to 50 inches; gray (5Y 5/1) loam, dark olive gray (5Y 3/2) moist; common fine prominent reddish brown (5YR 4/4) iron mottles; massive; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; few fine lime nodules about 1/8 inch in diameter; slightly effervescent; moderately alkaline; gradual wavy boundary.

IIC5g—50 to 60 inches; olive gray (5Y 5/2) very fine sandy loam, olive gray (5Y 4/2) moist; many fine faint dark greenish gray (5GY 4/1) and common fine prominent reddish brown (5YR 4/4) iron mottles; massive; hard, friable, nonsticky and nonplastic; many very fine interstitial pores; moderately alkaline.

The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon ranges from violently effervescent to slightly effervescent. The upper part of the C horizon has yellowish brown to dark grayish brown mottles. The lower part of the substratum has gray to greenish gray mottles.

The lower part of the substratum is sandy loam to very fine sandy loam. In some pedons strata of very gravelly coarse sand are at a depth of 54 inches or more. Small extremely hard lime nodules as much as 1/2 inch in diameter are common in some pedons.

Voltaire Variant

The Voltaire Variant consists of very deep, very poorly drained, slowly permeable soils on flood plains. These soils formed in alluvium derived from mixed sources of rock. Slope is 0 to 2 percent.

Typical pedon of Voltaire Variant clay loam; about 1,200 feet west and 500 feet north of the southeast corner sec. 15, T. 13 N., R. 20 E.

A1—0 to 6 inches; light gray (10YR 6/1) clay loam, very dark grayish brown (10YR 3/2) moist; many medium distinct reddish yellow (7.5YR 6/6) iron mottles; massive; very hard, firm, sticky and plastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; common medium faint light gray (10YR 7/2) lime segregations; violently effervescent; very strongly alkaline; abrupt smooth boundary.

C1—6 to 25 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; many fine and medium prominent reddish yellow (7.5YR 6/6) and yellowish red (5Y 6/6) iron mottles; few fine distinct very dark grayish brown (10YR 3/2) organic stains; massive; very hard, firm, very sticky and very plastic; many very fine, common fine, and few medium roots; many very fine and fine tubular pores; strongly effervescent; very strongly alkaline; abrupt smooth boundary.

IIC2—25 to 33 inches; light gray (10YR 6/1) silt loam, grayish brown (2.5Y 5/2) moist; few medium and coarse distinct reddish yellow (7.5YR 6/6) iron mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and fine tubular pores; slightly effervescent; strongly alkaline; clear smooth boundary.

IIC3—33 to 60 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and few fine tubular pores; slightly effervescent; strongly alkaline.

Depth to the water table ranges from 1 foot to 2 feet. The water table is high because of seepage from higher lying canals and from Dangberg No. 4 Reservior. The

water table did not reach a high level until the reservoir was constructed in 1905.

Iron mottles in the pedon range from common to many and from fine to medium. The mottles in the A and C horizons are of dominantly reddish hue, and those in the IIC horizon are of yellowish hue.

Washoe Series

The Washoe series consists of very deep, well drained soils on terraces. These soils formed in alluvium weathered from mixed sources of rock. Permeability is moderately slow. Slope ranges from 0 to 15 percent.

Typical pedon of Washoe cobbly sandy loam, 0 to 2 percent slopes; about 300 feet east and 75 feet south of the center sec. 28, T. 12 N., R. 20 E.

A11—0 to 2 inches; brown (10YR 5/3) cobbly coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; few fine and common very fine roots; many very fine and fine interstitial pores; 15 percent pebbles, 15 percent cobbles; slightly acid; abrupt smooth boundary.

A12—2 to 5 inches; pale brown (10YR 6/3) cobbly sandy loam, very dark grayish brown (10YR 3/3) moist; weak medium and fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and many very fine roots; common fine and very fine vesicular pores; 15 percent pebbles, 15 percent cobbles; slightly acid; abrupt smooth boundary.

A3—5 to 8 inches; brown (10YR 5/3) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine granular structure; soft, friable, nonsticky and nonplastic; common fine and many very fine roots; common fine and very fine interstitial and few very fine tubular pores; 15 percent pebbles, 5 percent cobbles; slightly acid; abrupt smooth boundary.

B1t—8 to 11 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and many very fine roots; common very fine and few fine tubular pores; common thin clay films on ped faces and lining pores; 20 percent pebbles, 5 percent cobbles; neutral; abrupt wavy boundary.

B2t—11 to 20 inches; brown (7.5YR 4/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; massive; very hard, friable, sticky and plastic; very few fine and common very fine roots; few fine and very fine interstitial and few fine tubular pores; thin continuous clay bridges between sand grains and thin clay films lining pores; 30 percent pebbles, 10 percent cobbles; pebbles and cobbles show visible signs of weathering; slightly acid; clear wavy boundary.

B31t—20 to 28 inches; brown (7.5YR 4/4) very gravelly coarse sandy loam, brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few fine and very fine interstitial pores; thin continuous clay bridges between sand grains and thin clay films on sand grains; 30 percent pebbles, 5 percent cobbles; most pebbles and cobbles show visible signs of weathering; slightly acid; gradual wavy boundary.

B32t—28 to 42 inches; brown (7.5YR 4/4) extremely gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; very few very fine roots; many very fine and fine interstitial pores; common thin clay bridges between sand grains and thin films on sand grains; 60 percent pebbles, 20 percent cobbles; few pebbles and cobbles show visible signs of weathering; slightly acid; gradual wavy boundary.

C—42 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 45 percent pebbles, 10 percent cobbles; neutral.

The thickness of the solum ranges from 32 to 45 inches. The argillic horizon is 24 to 40 inches thick. The content of rock fragments in any one horizon is highly variable. It ranges from 35 to 80 percent but averages 35 to 50 percent.

Witefels Series

The Witefels series consists of moderately deep, somewhat excessively drained, rapidly permeable soils on slopes of mountains. These soils formed in the residuum of granitic rock. Slope ranges from 4 to 75 percent.

Typical pedon of Witefels gravelly loamy coarse sand, in an area of Witefels-Rock outcrop complex, 15 to 30 percent slopes; about 200 feet west and 250 feet south of the northeast corner sec. 19, T. 13 N., R. 19 E.

O1—1 inch to 0; pine needles and leaves.

A1—0 to 3 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 15 percent pebbles; medium acid; clear smooth boundary.

C1—3 to 31 inches; light brownish gray (10YR 6/2) gravelly coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to medium roots; many very fine interstitial pores; 25 percent fine pebbles; slightly acid; clear smooth boundary.

C2r—31 inches; white (10YR 8/1) and gray (10YR 5/1) soft weathered granite.

The depth to the paralithic contact is 20 to 40 inches. The C horizon is loamy coarse sand or coarse sand that is 15 to 35 percent pebbles.

Zephan Series

The Zephan series consists of moderately deep, well drained, slowly permeable soils on side slopes and ridges of low hills. These soils formed in residuum and colluvium weathered from rhyolite and andesite. Slope ranges from 4 to 50 percent.

Typical pedon of Zephan very stony sandy loam, 15 to 30 percent slopes, in an area of Zephan association; about 1,200 feet east and 700 feet south of the northwest corner sec. 16, T. 13 N., R. 23 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very stony loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; few medium roots; many very fine interstitial pores; 50 percent pebbles, 3 percent stones and cobbles; slightly acid; abrupt smooth boundary.

A12—2 to 5 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine and few fine tubular pores; 15 percent pebbles; slightly acid; abrupt smooth boundary.

B21t—5 to 6 inches; pale brown (10YR 6/3) very gravelly sandy clay, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and few medium roots; few very fine and fine tubular pores; continuous thin clay films coating sand grains; 25 percent pebbles, 10 percent cobbles; slightly acid; abrupt wavy boundary.

B22t—6 to 13 inches; yellowish brown (10YR 5/4) very cobbly clay, dark brown (10YR 4/3) moist; strong very coarse prismatic structure; hard, firm, very sticky and very plastic; few medium roots; few very fine and fine exped roots; continuous thin clay film coating ped faces; 10 percent pebbles, 25 percent cobbles; slightly acid; abrupt wavy boundary.

B23t—13 to 18 inches; yellowish brown (10YR 5/4) very cobbly clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; hard, firm, very sticky and very plastic; few medium roots; few very fine and fine exped pores; continuous thin clay films coating ped faces; 10 percent pebbles, 30 percent cobbles; slightly acid; abrupt smooth boundary.

B24t—18 to 21 inches; light yellowish brown (10YR 6/4) extremely cobbly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few very fine and fine tubular pores; continuous thin clay films coating ped faces and rock fragments; 60 percent cobbles; slightly acid; abrupt wavy boundary.

B3t—21 to 26 inches; pale brown (10YR 6/3) ped face and yellowish brown (10YR 5/4) ped interior cobbly sandy clay loam, brown (10YR 5/3) moist ped face and dark yellowish brown (10YR 4/4) moist ped interior; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common thin clay film coating rock faces; 35 percent cobbles; slightly acid; abrupt wavy boundary.

Cr—26 to 32 inches; weathered andesite.

R—32 inches; andesite bedrock.

The thickness of the solum and the depth to paralithic contact is 25 to 40 inches. The B horizon is clay or sandy clay and is 35 to 60 percent rock fragments.

Factors of Soil Formation

Soil is a natural body on the earth's surface in which plants grow. It is a mixture of varying proportions of rocks, minerals, organic matter, water, and air. The rocks and minerals are fragmented and are partly or wholly weathered. Soils have distinctive layers, or horizons, that are the product of environmental forces acting upon material deposited or accumulated through geologic activity.

Soils differ one from the other in different localities and within short distances. The differences are the result of the interaction of five soil-forming factors that are known to affect soil formation. These factors are (1) climate, mainly the temperature and kind and amount of precipitation that have existed since accumulation of the parent material; (2) relief, mainly as it affects the internal and external soil properties, such as drainage, aeration, susceptibility to erosion, and exposure to sun and wind; (3) biological forces, mainly the plant cover and the organisms living in and on the soil; (4) parent material, including texture and structure of the material as well as its mineralogical and chemical composition; and (5) the length of time that the soil-forming factors have been operating.

The overall landscape of the survey area, mainly the mountains and valleys, is the result of geologic stratigraphic and structural control. The present topography and landforms, however, are the result of events that took place during Quarternary time. The kinds of soil that formed are indicative of the stability and age of the surfaces of the landforms on which they occur.

Climate

The average annual precipitation ranges from about 6 inches at lower elevations in the eastern part of the survey area to about 50 inches or more in the western part in the Carson Range. The average annual temperature ranges from about 52 degrees F. in the eastern part of the area to as low as 38 degrees in the high mountain ranges. Major climatic variations are the result of the effects of relief and distance from the Sierra Nevada Mountains. Temperature decreases and precipitation increases as elevation increases. Because of the rain shadow effect of the Sierras, the rate of precipitation increase is higher in the western part of the survey area than in the eastern part. As a consequence, the soils reflect a general zonation with respect to elevation and longitude. The rain shadow effect makes the survey area progressively drier from west to east.

In the lower elevations of the survey area, the average annual precipitation is about 4 to 8 inches. In this arid part weathering of parent material is slow, leaching is incomplete, and eluviation and illuviation proceed at a very slow rate. The plant cover is sparse and consists mainly of drought-tolerant and salt-tolerant shrubs. Typically, the soils are low in content of organic matter and have a thin, light-colored A horizon. Soluble salts and calcium carbonate accumulate in the soil at a relatively shallow depth. Typic Haplargids (Perazzo series) represent soils that reflect the processes of formation in this arid part of the area.

In the rest of the survey area, except the Carson Range, the average annual precipitation is about 8 to 20 inches at elevations of 4,500 to 9,000 feet. As elevation increases, there is an accompanying increase in precipitation, which results in deeper leaching of salts and calcium carbonate, a decrease in pH value, changes in the kind and density of vegetation, and a thicker and darker A horizon. Xerollic Haplargids (Washoe series) represent soils formed at lower elevations where precipitation is about 10 inches. Aridic Argixerolls (Hyloc series) are examples of soils that formed at mid elevations in this zone. At the higher elevations in this part of the survey area, the vegetation is mostly sagebrush, but there is a great amount of and variation in the kinds of grasses. Leaching of salts and carbonates has been more intensive, the soils are neutral or slightly acid, and the A horizon is thick and high in content of organic matter. Pachic Argixerolls (Softscrabble series) are typical of these soils.

In the western part of the survey area in the Carson Range, elevation ranges from 5,600 to 10,000 feet. The average annual precipitation is 16 to 50 inches, and the mean annual temperature is 38 to 45 degrees. As elevation increases, there is an increase in precipitation and a decrease in temperature.

Typically at the lower elevations, where there is less precipitation and warmer temperatures, the vegetation is mostly Jeffrey pine and an understory of sagebrush and perennial grasses. The soils have high base saturation and are neutral or slightly acid. Typic Xeropsamments (Toiyabe series) are examples of soils that reflect these properties. As elevation and precipitation increase, there is increased leaching. This is reflected in a decrease in

the base saturation of the surface layer. Aquic Cryoboralfs (Shakespeare series) are examples of soils that reflect this property.

In winter, freezing and thawing generally occur throughout the survey area, except in those areas that generally are insulated by snow cover. The effects of frost action are discernible by the heaving of plants and erosion of the surface soil resulting from solifluction. At some of the higher elevations freezing and thawing have fractured and displaced the bedrock. Typic Cryorthents (Graylock series) that have a sandy-skeletal control section are examples of soils at high elevations that have been affected by frost action.

Relief

Relief, through its effect on drainage, runoff, erosion, and exposure to the sun and wind, has had an important effect on soil formation in the survey area. The mountain ranges, valleys, and flood plains reflect the overall variations in relief.

The mountain ranges have mainly steep relief. Runoff is rapid or very rapid, and the hazard of erosion is high. The removal of material by erosion inhibits or prevents soil development. Development in soils on unstable mountain surfaces that are subject to a high rate of geologic erosion is primarily limited to accumulation of organic matter to form a dark-colored horizon. A cambic or an argillic horizon has formed in the soils on more stable mountain surfaces where the rate of geologic erosion has been slower. Xerollic Paleargids (Borda series) and Aridic Argixerolls (Indiano series) are examples of soils that formed on the more stable mountain slopes and have an argillic horizon. Lithic Haploxerolls (Aldax series) and shallow Typic Cryopsamments (Temo series) are examples of soils on less stable mountain slopes where factors of soil formation have been unable to act on parent material long enough for argillic or cambic horizons to develop.

Soils on concave and north-facing slopes, where snowpockets form and remain until late in spring or early in summer, support a dense stand of shrubs, grasses, and in some places, aspen. The soils in these areas have developed a thick, dark colored A horizon that has a high content of organic matter. Pachic Argixerolls (Softscrabble series) and Pachic Haploxerolls (Glean series) are examples of these soils.

The valleys within the survey area are essentially semibolsons that receive drainage water from the surrounding mountain ranges. Some of these valleys are characterized by a series of terraces cut in Tertiary-Quaternary valley-fill material. Stream erosion has dissected the valley fill. Downcutting of the valley has been interrupted several times, and these events are marked by the development of terraces and alluvial fan remnants. The dissection patterns have resulted in a sloping interfluvial surface, steep interfluvial side slopes, and narrow flood plains along drainageways. The interfluvial areas have been relatively stable over a long period of time because of the bypassing of drainage water from uplands through dissecting channels. Abruptic Xerollic Durargids (Reno series) and Xerollic Paleargids (Phing series) are examples of soils on the interfluvial areas. Aridic Argixerolls (Cassiro series) are examples of soils on the higher lying stable side slopes. Xeric Torriorthents (Puett series) are on the less stable side slopes. In the areas where there has been less dissection, fine-loamy Xerollic Haplargids (Greenbrae series) and Aridic Argixerolls (Springmeyer series) are typical of soils on the alluvial fan remnants; coarse-loamy Xerollic Haplargids (Saralegui series) characterize the alluvial fan skirts; Xerollic Camborthids (Haybourne series) typify the inset alluvial fans; and Xerollic Haplargids (Turria series) represent the soils found on the alluvial flats.

The nearly level flood plains and low terraces along the Carson River have a high water table and are subject to flooding. Unless drained, the soils in these areas support dense stands of meadow vegetation that has contributed a large amount of organic matter to the soils, producing a dark colored A horizon. Some of these soils have excess soluble salts in the upper part of the profile. Fluvaquentic Haplaquolls (Voltaire series) and Duric Haplaquolls (Cradlebaugh series) are examples of soils formed on the wet bottom lands. Aquic Natrixerolls (Fettic series) are an example of soils on low terraces.

Biological Forces

Plants, animals, insects, and microflora are important biological forces that affect soil formation in the survey area. Although animals, such as badgers and ground squirrels, and insects, such as cicadas, have had some effect on soil development, plants appear to have had the major biological influence.

The vegetation in the area has been particularly important in reducing erosion. This factor has helped to maintain the stability of the land surface so that normal soil formation could take place.

Because of climatic differences, the kinds and amounts of plants vary considerably as elevation increases. On alluvial flats, terraces, and alluvial fans at low elevations, especially in the eastern part of the area, the main plants are drought-tolerant and salt-tolerant shrubs. Because of the scarcity of available moisture, plants cover only a small part of the surface. They add little organic matter to the soil and provide little protection from the wind and sun. Salt-tolerant shrubs also tend to recycle salts from the deeper layers to the surface.

On flood plains where drainage is restricted, the dense growth of meadow vegetation has supplied the organic matter that gives Fluvaquentic Haplaquolls (Voltaire

series) and Cumulic Haplaquolls (James Canyon series) a dark colored A horizon.

Alluvial fans, terraces, and foothills at higher elevations support a plant cover of shrubs and grasses that is transitional from desert shrubs.

The mountainous areas, except the Carson Range, support denser stands of shrubs, grasses, and in some places, pinyon and juniper. Because of the more abundant vegetation, the A horizon of the soils in these areas is thick, high in organic matter, and dark in color.

The mountainous area of the Carson Range supports mostly coniferous forest. Soils that formed under this vegetative cover have a thin mat of litter and duff 1/2 inch to about 3 inches thick. The forest litter is attacked by fungus and other micro-organisms. The fungi are particularly effective because of their ability to decompose surface litter with low moisture content and good air circulation. They are especially active in acid soils, such as those formed under forest cover, and contribute to their development.

Parent Material

Parent material is the weathered rock or unconsolidated material from which soils form. The hardness, grain size, and porosity of the parent material and its mineral and chemical composition greatly influence soil formation.

The main sources of parent material in the survey area are intrusive and extrusive igneous rocks, metamorphic rock, sedimentary rock, colluvium, alluvium, and eolian material, including volcanic ash and sand.

Granodiorite and quartz monzonite are abundant intrusive igneous rock. They are mainly in the Carson Range, Pine Nut Mountains, and Sweetwater Range. The intrusive rock contains minerals that weather to clay. Soils formed in materials derived from this kind of rock have an argillic horizon if the landform surfaces have been stable for sufficient time. Aridic Argixerolls (Trid series) and Argic Lithic Cryoborolls (Genoa series) are examples of these soils. Soils on the steeper slopes that formed in material derived from granitic rock and receive more precipitation generally are undergoing erosion. They consequently do not have horizon development, except for some accumulation of organic matter in an A horizon. They are generally sandy and contain rock fragments. Typic Xeropsamments (Toiyabe series) and Typic Cryorthents (Graylock series) are examples of these soils.

Basalt, andesite and rhyolite, flow breccias, basaltic andesite, and pyroxene andesite flows are extrusive igneous rock. Some of these volcanic rocks are in the Pine Nut Mountains, Buckskin Range, Wellington Hills, and the surrounding foothills. Because the extrusive rock contains appreciable quantities of minerals that weather to clay, most soils on stable slopes of mountains and foothills that formed in these materials have an argillic horizon. The argillic horizon is commonly quite clayey. Aridic Argixerolls (Cagle series), and Xerollic Paleargids (Borda series) are examples of these soils.

Metamorphic rock is the source of parent material in limited areas, mainly in the Carson Range, Pine Nut Mountains, and Wellington Hills. Most kinds of this rock contain minerals that weather to clay. Aquic Cryoboralfs (Shakespeare series) and Aridic Argixerolls (Koontz series) are examples of soils that have an argillic horizon and that formed in materials derived from metamorphic rock. Entic Ultic Haploxerolls (Vicee series) and Aridic Haploxerolls (Sutro series) are examples of soils formed in metamorphic rock on unstable land surfaces where an argillic horizon has not formed.

Tuffaceous sedimentary and medisedimentary lacustrine and fluviatile deposits are the source of parent material for some soils in the foothills of the Pine Nut Mountains and Wellington Hills. This material is predominantly mudstone with sandstone, shale, marl, diatomite, and calcareous tuff. Xerollic Haplargids (Chalco series) and Xerollic Paleargids (Verdico series) are examples of soils that formed on stable surfaces in this material. In areas where the surfaces have been less stable Xeric Torriorthents (Puett series) have formed.

Limestone as a source of parent material is very limited in the survey area. The limestone contains a few minerals that weather to clay, but the high carbonate content restricts clay movement. Lithic Xeric Torriorthents (Kram series) are examples of soils formed in limestone.

Alluvium has been eroded from the surrounding mountains and deposited as alluvial fans, alluvial flats, and flood plains. It consists of sandy, loamy, and clayey material of generally mixed mineralogy.

The alluvium that was deposited as alluvial fans was derived from mixed sources of rock. It is mostly loamy and contains variable amounts of gravel, cobbles, and stones. It is porous and contains minerals that weathered to clay and to soluble silica that resulted in the cementation of duripans. Xerollic Durargids (Indian Creek series) and Aridic Durixerolls (Nevador Variant) are examples of soils that have an argillic horizon and a duripan that formed in alluvium on stable alluvial fans. Alluvium that derived from granitic rock generally produced sandy soils that contain varying quantities of gravel, cobbles, and stones. Xeric Torripsamments (Toll series) and Torripsammentic Haploxerolls (Mottsville series) are examples of sandy soils formed in granitic alluvium.

The alluvium that was deposited as alluvial flats was derived from mixed sources of rock. It is silty or clayey and contains soluble salts. Soils that formed in this material typically have a natric horizon. Typic Natrargids that have a fine-loamy natric horizon (Updike Variant) and that have a clayey natric horizon (Updike series) are typical examples.

Sandy eolian materials are of limited extent in the survey area. They occur in wind-active areas, mainly east of Hot Spring Mountain. Xeric Torripsamments (Incy series) are examples of these sandy soils. These soils are in areas where the parent material has been stabilized by vegetation.

Time

Time is required for the formation of soil. The amount of time required depends on the intensity and interaction of the other soil-forming factors. Thickness of the A and B horizons and other characteristics of these horizons and other horizons reflect the relative age of the soil. The age or strength of expression of the horizons reflects the amount of weathering of parent material and the interaction of moisture, temperature, and biological activity as influenced by time.

The soils in this survey area range from a few years to possibly a few hundred thousand years or more in age. This range in age is a major reason for the many kinds of soil.

The influence of time and other soil-forming factors are not well understood. Many soil scientists and some geologists feel that weathering of parent material and soil profile development have been essentially continuous, with little change in rate throughout Quaternary time (*12, 13, 16, 19*).

Recently, geologists concerned with differentiating Quaternary deposits have proposed that soil development has not proceeded continuously at the same rate, but has taken place intermittently at rapid rates (*9, 10, 11, 15*). These geologists have developed the technique of mapping soil stratigraphic units which use weathering profiles as stratigraphic markers to differentiate and correlate Quaternary deposits. This concept of soil development is based on the assumption that weathering profiles formed in response to infrequent combinations of climatic factors that induced minimal erosion and deposition and a greatly accelerated rate of chemical weathering.

Although disagreements exist in regard to the relative influences of time and other soil-forming factors, the concept of intermittency of soil formation has been supported by numerous studies and provides a practical technique to discuss the age of soil in the survey area in relation to geologic climatic units in Quaternary time.

The kinds of diagnostic subsurface horizons and other subsurface diagnostic properties, together with their strength of expression, provide general clues as to the age of the soil. Important subsurface diagnostic horizons present in soils within the area include argillic, natric, and cambic horizons and horizons exhibiting silica cementation.

Prominent argillic horizons are generally only in soils that formed primarily during Pleistocene time. This concept has been established by studies (*4, 5*) and is supported in Soil Taxonomy (*18*). As age increases and other conditions remain constant, the argillic horizon becomes finer in texture, somewhat thicker, and tends to develop an abrupt upper boundary. Weakly expressed, thin argillic horizons may have formed during very late Pleistocene time or early Holocene time.

Natric horizons are a special kind of argillic horizon that formed under the influence of high exchangeable sodium content. The effect of sodium on the dispersion of clay may accelerate the rate of formation of the argillic horizon. This is not believed to be significant, however, except in weakly expressed natric horizons that formed on Holocene surfaces. Following an earlier development as argillic horizons, prominent natric horizons may have developed their present characteristics as a result of sodium supplied with eolian deposits. Transporation and deposition of sodium salts together with eolian deposits are believed to be an important present-day process that affects the physical and chemical properties of soils in the area.

Cambic horizons in soils within the area formed for the most part in calcareous sediment. Original stratification is absent, and carbonates have been removed and redeposited in underlying horizons. Investigations in southern New Mexico indicate that cambic horizons in that region are less than about 5,000 years old (*3*). Cambic horizons in the survey area and in other areas in northern Nevada have been generally thought to be less than 10,000 years old, and possibly less than 7,000 years old. This age has been determined mostly as a result of soil mapping in areas located below the last high stage of Pleistocene Lake Lahontan (*6,9,10,11*).

The strength of expression of diagnostic subsurface horizons and their relation to soil genesis indicate a sequence in age of the soils that ranges from present-day Holocene to early-late Pleistocene or possibly older.

The youngest soils in the area are those that formed in recently aggraded material or in material recently exposed by erosion. Included among these soils are; Xeric Torripsamments (Toll series) and Aquic Xerofluvents (Job series) that formed in recent alluvium; Lithic Xeric Torriorthents (Kram series) that formed in material weathered from limetone on upland slopes where erosion has been active; and Xeric Torripsamments (Incy series) that formed on stabilized sand dunes.

Somewhat older than the youngest soils are soils that formed in alluvium on wet flood plains, on slowly aggrading inset fans, and on recently eroded mountain slopes. These soils have been stable long enough to have accumulated organic matter and have formed a dark colored A horizon. They do not have an argillic, natric, or cambic horizon, duripans, or durinodes. They are probably less than about 1,000 years old. Typic Haplaquolls (Jubilee series) and Cumulic Haplaquolls (James Canyon series) are soils that formed on wet flood plains. Torriorthentic Haploxerolls (Mottsville series)

are soils that formed on slowly aggrading alluvial fans. Lithic Haploxerolls (Aldax series) are soils that formed on steep mountain slopes.

Soils that formed in alluvium and that have developed subsurface horizons containing durinodes or horizons with weak silica cementation are also older than the youngest soils. They may be slightly older than the soils that have developed a dark colored A horizon as their only major diagnostic feature. These soils occur on alluvial flats, flood plains, and low stream terraces and have formed in saline and alkali parent material containing an appreciable amount of volcanic ash. The presence of volcanic ash as a source of soluble silica with alkaline reaction probably contributes to the relatively rapid formation of durinodes and incipient silica cementation. Duric Haplaquolls (Cradlebaugh series) are soils that have horizons with incipient silica cementation as a major diagnostic feature.

Stable Holocene land surfaces about 2,000 to 10,000 years old are present but not extensive in the survey area. The soils that formed on these surfaces have a cambic horizon. Xerollic Camborthids (Haybourne series) have a cambic horizon and formed on alluvial fans. Aridic Haploxerolls (Sutro series) formed on mountain slopes.

Soils that have a relict argillic horizon and are believed to be of late Pleistocene age make up about half of the soil series mapped in the survey area. These soils are on mountains, foothills, alluvial fans, and terraces. The fact that extensive areas of these kinds of soils exist today is evidence that major erosional and depositional events have not taken place or have been minor in extent since late Pleistocene time.

Late Pleistocene time represents a period of approximately 10,000 to 250,000 years before the present time (*14*). This time period is separated into latest Pleistocene or earliest Holocene, late-late Pleistocene, mid-late Pleistocene, and early-late Pleistocene.

Stable late-late Pleistocene or early Holocene land surfaces are not extensive in the survey area. Soils that formed on these surfaces have thin, weak, or minimal argillic or natric horizons. Xerollic Haplargids (Saralegui series) have a minimal argillic horizon and developed on an alluvial fan skirt. Xerollic Haplargids (Turria series) formed on an alluvial flat. Aquic Natrixerolls (Fettic series) have a minimal natric horizon formed on a low terrace.

Stable mid-late Pleistocene land surfaces are extensive. Examples of mid-late Pleistocene age soils are Xerollic Haplargids (Surgem series) that have a clayey-skeletal argillic horizon and formed in granitic residuum and Aridic Argixerolls (Cagle series) that have a clayey-skeletal horizon and formed in volcanic residuum. The Surgem and Cagle soils formed on foothills. Other soils that formed in mid-late Pleistocene age are Aquic Cryoboralfs (Shakespeare series) that have a loamy-skeletal horizon formed on mountain slopes and Xerollic Haplargids (Greenbrae series) that have a fine-loamy argillic horizon and formed on alluvial fans and terraces.

Stable early-late Pleistocene or possibly older land surfaces are on dissected alluvial fan remnants, terrace remnants, and pediment surfaces cut in soft Tertiary rock. Abruptic Xerollic Durargids (Reno series) have a thick, clayey argillic horizon and a thick duripan. They formed on the old alluvial fan or terrace remnant surfaces. Xerollic Paleargids (Verdico series and Phing series) have a thick, clayey argillic horizon that is 45 to 60 percent clay. They also formed on these surfaces.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3.5
Low	3.5 to 5
Moderate	5 to 7.5
High	More than 7.5

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Durinodes. Weakly cemented to indurated nodes. The cement is presumably opal and microcrystalline forms of silica.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fan apron. A component landform comprised of a sheetlike mantle of relatively young alluvium covering part of an older fan piedmont (and occasionally an alluvial fan) surface. It somewhere buries a pedogenic soil that can be traced to the edge of the fan apron where the soil emerges as the land surface, or relict soil. No buried soils should occur within a fan-apron mantle; rather, they separate mantles.

Fan collar. A component landform comprised of a thin, short, relatively young mantle of alluvium along the very upper margin of a major alluvial fan at a mountain front. The mantle somewhere buries a pedogenic soil that can be traced to the edge of the fan collar where it emerges as the land surface, or relict soil.

Fan remnant. A generic term for component landforms that are the remaining parts of various older fan landforms that either have been dissected (erosional fan remnants) or partially buried (nonburied fan remnants). Erosional fan remnants must have a flatish summit of relict fan surface. Fan remnants may be specifically identified as fan-piedmont remnants, inset fan remnants, etc.

Fan skirt. A major landform comprised of laterally coalescing, small alluvial fans that issue from gullies cut into, or that are extensions of, inset fans of the fan piedmont and that merge along their toe slopes with the basin floor. Fan skirts are smooth or are only slightly dissected and ordinarily do not comprise component landforms.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Inset fan. A special case of the flood plain of a commonly ephemeral stream that is confined between fan remnants, basin floor remnants, ballenas, or closely opposed fan toe slopes. Its transversely-level cross section is evidence of alluviation of a fluve. It must be wide enough that raw channels cover only a fraction of this component landform's surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a

soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Snow pockets. Concave areas where snow accumulates and remains for longer periods than in adjacent areas.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of Na@ to Ca@@ + Mg@@. The degrees of sodicity are—

	SAR
Slight	Less than 13:1
Moderate	13-30:1
Strong	More than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the

underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1957-75 at Topaz Lake, Nevada]

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average daily	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days[1]	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	47.7	17.8	32.8	68	-10	30	1.64	0.30	2.68	3	6.3
February---	52.2	22.0	37.1	71	3	44	1.29	0.16	2.11	2	4.6
March------	56.1	24.8	40.4	76	8	100	1.05	0.20	1.70	3	1.9
April------	62.0	28.3	45.2	83	13	200	0.49	0.07	0.81	2	2.3
May--------	72.1	36.5	54.3	90	21	443	0.83	0.10	1.39	2	0.5
June-------	81.5	43.9	62.7	99	30	681	0.66	0.09	1.10	2	0.0
July-------	90.5	49.3	69.9	101	36	927	0.63	0.00	1.11	1	0.0
August-----	89.3	47.3	68.3	99	33	877	0.55	0.00	.96	2	0.0
September--	81.2	39.4	60.4	95	22	612	0.40	0.01	0.67	1	0.0
October----	70.0	30.5	50.3	88	13	319	0.42	0.00	0.73	1	0.0
November---	56.7	23.4	40.1	75	5	72	1.07	0.22	1.75	3	2.0
December---	48.9	18.2	33.5	67	-5	14	1.09	0.33	1.70	3	3.8
Year-------	67.4	31.8	49.6	101	-12	4,319	10.12	7.30	12.95	25	21.4

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1957-75 at Topaz Lake, Nevada]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	June 22	July 1	July 30
2 years in 10 later than--	June 3	June 10	July 7
5 years in 10 later than--	April 26	May 2	May 23
First freezing temperature in fall:			
1 year in 10 earlier than--	August 18	August 5	July 15
2 years in 10 earlier than--	September 7	August 27	August 8
5 years in 10 earlier than--	October 16	October 6	September 22

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-73 at Minden, Nevada]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	129	115	77
8 years in 10	136	121	85
5 years in 10	151	133	101
2 years in 10	165	145	116
1 year in 10	173	151	124

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
101	Aldax stony fine sandy loam, 15 to 50 percent slopes	230	0.1
102	Aldax-Indiano association	2,972	0.7
111	Borda gravelly sandy loam, 4 to 15 percent slopes	217	*
121	Borda Variant-Genoa-Burnborough Variant association	585	0.1
122	Borda Variant-Glean association	1,240	0.3
123	Borda Variant-Glean-Chen association	3,152	0.7
124	Borda Variant-Burnborough Variant-Cassiro association	804	0.2
141	Brockliss stony loamy sand, 0 to 8 percent slopes	590	0.1
151	Cagle-Deven-Nosrac association	6,619	1.5
152	Cagle-Duco association	774	0.2
153	Cagle-Duco-Rock outcrop association	3,714	0.9
154	Cagle-Nosrac association	9,240	2.1
155	Cagle-Nosrac-Borda association	3,118	0.7
156	Cagle-Burnborough-Rock outcrop association	745	0.2
161	Witefels-Rock outcrop complex, 4 to 15 percent slopes	387	0.1
162	Witefels-Rock outcrop complex, 15 to 30 percent slopes	216	*
163	Witefels-Rock outcrop complex, 30 to 50 percent slopes	1,301	0.3
164	Witefels-Rock outcrop complex, 50 to 75 percent slopes	644	0.1
165	Witefels-Temo complex, 30 to 75 percent slopes	1,569	0.4
181	Chalco complex, 8 to 30 percent slopes	3,472	0.8
182	Chalco-Pula association	2,305	0.5
183	Chalco association	1,022	0.2
191	Cradlebaugh clay loam, drained, slightly saline-alkali	1,923	0.4
192	Cradlebaugh clay loam, drained, strongly saline-alkali	1,922	0.4
193	Cradlebaugh clay loam, slightly saline-alkali	2,212	0.5
194	Cradlebaugh clay loam, strongly saline-alkali	591	0.1
201	Dangberg silt loam, drained, strongly saline-alkali	390	0.1
202	Dangberg clay, slightly saline-alkali	514	0.1
203	Dangberg clay, strongly saline-alkali	1,430	0.3
204	Dangberg clay, wet	536	0.1
205	Dangberg clay, wet, strongly alkali	207	*
211	Devada-Drit-Roloc association	791	0.2
212	Devada-Koontz association	2,781	0.6
213	Devada-Burnborough Variant association	1,334	0.3
214	Devada-Rock outcrop association	798	0.2
221	East Fork Variant loam	715	0.2
231	Brockliss Variant-Dangberg association	586	0.1
241	Dressler coarse sandy loam	990	0.2
242	Dressler sandy loam, wet	451	0.2
251	Duco-Cagle-Nosrac association	7,559	1.7
252	Duco-Devada-Nosrac association	4,893	1.1
253	Duco-Nosrac association	1,780	0.4
254	Duco-Nosrac-Burnborough Variant association	2,907	0.7
255	Duco-Searles association	3,610	0.8
261	Dumps-Pits complex, 15 to 75 percent slopes	275	0.1
271	East Fork loam	477	0.1
272	East Fork clay loam	929	0.2
281	Fettic very fine sandy loam	1,028	0.2
282	Fettic clay, strongly saline	447	0.1
292	Vicee Variant-Rock outcrop complex, 30 to 50 percent slopes	651	0.1
301	Franktown-Rubble land-Rock outcrop complex, 50 to 75 percent slopes	3,758	0.9
311	Gardnerville clay loam	1,132	0.3
312	Gardnerville clay loam, drained	1,272	0.3
313	Gardnerville clay loam, slightly saline-alkali	388	0.1
314	Gardnerville clay	751	0.2
315	Gardnerville clay, slightly saline-alkali	243	0.1
321	Genoa-Glean association	1,817	0.4
322	Genoa-Glean-Rock outcrop association	4,292	1.0
331	Glean-Genoa association	2,765	0.6
332	Glean-Genoa-Rubble land association	3,141	0.7
334	Glean-Sup-Genoa association	7,799	1.8
341	Glenbrook sands, 8 to 30 percent slopes	1,414	0.3
342	Glenbrook-Rock outcrop complex, 30 to 50 percent slopes	749	0.2
351	Godecke fine sandy loam	2,512	0.6
362	Gralic-Rock outcrop complex, 8 to 50 percent slopes	692	0.2
363	Gralic-Rock outcrop complex, 50 to 75 percent slopes	1,223	0.3
371	Graylock extremely stony loamy coarse sand, 30 to 50 percent slopes	177	*
372	Graylock extremely stony loamy coarse sand, 50 to 75 percent slopes	654	0.2
381	Greenbrae fine sandy loam, 0 to 4 percent slopes	2,209	0.5

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
382	Greenbrae gravelly fine sandy loam, 4 to 8 percent slopes	875	0.2
391	Haybourne sand, 0 to 4 percent slopes	2,752	0.6
392	Haybourne loam, 0 to 2 percent slopes	1,882	0.4
393	Haybourne loam, 2 to 4 percent slopes	1,090	0.3
394	Haybourne fine sandy loam, gravelly substratum, 0 to 2 percent slopes	1,539	0.4
401	Heidtman clay loam	1,042	0.2
402	Heidtman clay loam, clay substratum	374	0.1
411	Henningsen loam	228	*
412	Henningsen loam, wet	522	0.2
413	Henningsen gravelly loam	777	0.2
414	Henningsen gravelly loam, wet	726	0.2
422	Henningsen Variant loam	724	0.2
431	Shalcar family peat	533	0.1
442	Holbrook gravelly fine sandy loam, 2 to 8 percent slopes	661	0.2
443	Holbrook very stony sandy loam, 4 to 15 percent slopes	2,490	0.6
444	Holbrook-Glenbrook association	365	0.1
445	Holbrook-Greenbrae-Reno association	874	0.2
446	Holbrook-Verdico association	781	0.2
451	Hyloc-Ister association	605	0.1
461	Hussman silty clay loam	527	0.1
462	Hussman clay loam, strongly saline-alkali	192	*
463	Hussman clay	1,196	0.3
471	Incy fine sand, 4 to 30 percent slopes	2,670	0.6
481	Indian Creek sandy loam, 0 to 4 percent slopes	2,497	0.6
482	Indian Creek gravelly fine sandy loam, 4 to 15 percent slopes	8,636	2.0
483	Indian Creek very cobbly loam, 2 to 8 percent slopes	3,850	0.9
485	Indian Creek-Haybourne association	8,619	2.0
486	Indian Creek-Reno-Cassiro association	4,373	1.0
487	Indian Creek Variant-Cassiro-Puett association	3,208	0.7
488	Indian Creek Variant-Roloc association	851	0.2
491	Indiano stony fine sandy loam, 30 to 50 percent slopes	428	0.1
501	James Canyon loam, drained, 2 to 4 percent slopes	462	0.1
502	James Canyon loam, drained, 4 to 8 percent slopes	396	0.1
503	Kimmerling Variant peat, 2 to 8 percent slopes	187	*
511	James Canyon Variant loam, 2 to 4 percent slopes	397	0.1
512	James Canyon Variant loam, slightly saline, 4 to 8 percent slopes	220	0.1
521	Job loam	702	0.2
523	Job loam, wet	344	0.1
524	Job loam, clay substratum	327	0.1
531	Jubilee loam	285	0.1
532	Jubilee clay, slightly saline-alkali	189	*
533	Jubilee Variant peat	353	0.1
534	Jubilee-Dressler-Kimmerling complex	1,333	0.3
541	Softscrabble-Glean-Genoa association	3,228	0.7
552	Kimmerling loam, wet	405	0.1
553	Kimmerling clay loam	2,613	0.5
555	Kimmerling clay loam, clay substratum	524	0.1
561	Koontz-Sutro complex, 15 to 30 percent slopes	540	0.1
562	Koontz-Sutro complex, 30 to 50 percent slopes	1,114	0.3
571	Kram-Puett Variant association	4,098	0.9
581	Loomer association	19,307	4.0
582	Loomer-Olac association	302	0.1
583	Loomer-Zephan-Olac association	1,091	0.3
591	Minneha-Drit-Glean association	4,972	1.1
592	Minneha-Drit-Rock outcrop association	3,851	0.9
601	Mottsville loamy coarse sand, 2 to 4 percent slopes	695	0.2
602	Mottsville gravelly loamy coarse sand, 4 to 15 percent slopes	3,661	0.8
603	Mottsville very bouldery loamy coarse sand, 2 to 15 percent slopes	253	0.1
604	Mottsville-Drit-Roloc association	3,231	0.7
611	Nevador fine sandy loam, 0 to 2 percent slopes	2,101	0.5
612	Nevador fine sandy loam, 4 to 8 percent slopes	247	0.1
621	Niwot loam	259	0.1
622	Niwot clay loam, clay substratum	234	0.1
631	Olac-Ister-Rock outcrop association	2,409	0.6

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
641	Ophir gravelly sandy loam, 0 to 2 percent slopes	1,615	0.4
642	Ophir gravelly sandy loam, 2 to 8 percent slopes	2,072	0.4
644	Ophir Variant peat, 2 to 4 percent slopes	548	0.1
651	Oppio-Nosrac association	629	0.1
661	Ormsby loamy sand	688	0.2
662	Ormsby gravelly loamy coarse sand	874	0.3
671	Pernty-Burnborough Variant-Chen association	474	0.1
672	Pernty-Burnborough-Glean association	896	0.2
673	Pernty-Burnborough-Rock outcrop association	1,268	0.3
681	Phing sandy loam, 4 to 8 percent slopes	455	0.1
682	Phing cobbly sandy loam, 4 to 15 percent slopes	678	0.2
683	Phing gravelly loam, 0 to 4 percent slopes	1,089	0.3
685	Phing-Chalco-Uhaldi association	5,858	1.3
691	Updike Variant loam	653	0.2
693	Updike Variant-Playas association	334	0.1
702	Perazzo gravelly loam, 2 to 8 percent slopes	366	0.2
712	Prey gravelly loamy sand, 0 to 4 percent slopes	1,766	0.4
713	Prey stony sandy loam, 4 to 15 percent slopes	268	0.1
721	Prey Variant stony loam, 2 to 15 percent slopes	776	0.2
731	Job Variant silt loam	618	0.1
741	Puett-Chalco association	3,082	0.7
742	Puett-Chalco-Pula complex, 30 to 50 percent slopes	1,540	0.4
743	Puett-Verdico-Haybourne association	740	0.2
744	Puett-Verdico-Uhaldi association	3,885	0.9
751	Pula-Cassiro association	1,186	0.3
752	Pula-Chalco-Pung association	1,337	0.3
753	Pula-Nosrac-Pung association	3,297	0.8
762	Pulcan-Puett-Uhaldi association	9,677	2.2
771	Rawe gravelly sandy loam, 4 to 15 percent slopes	536	0.1
772	Rawe gravelly fine sandy loam, 2 to 4 percent slopes	359	0.1
781	Reno gravelly sandy loam, 2 to 8 percent slopes	11,932	2.6
782	Reno gravelly sandy loam, 8 to 15 percent slopes	302	0.1
783	Reno very cobbly loam, 2 to 8 percent slopes	2,104	0.5
784	Reno gravelly clay loam, 0 to 4 percent slopes	113	*
785	Phing Variant-Reno association	273	0.1
786	Reno-Phing-Springmeyer association	1,976	0.5
787	Reno-Saralegui association	2,995	0.7
788	Reno-Stucky association	2,036	0.5
789	Phing Variant-Zephan association	827	0.2
791	Risue gravelly loam, 0 to 8 percent slopes	1,959	0.5
792	Risue very gravelly loam, 8 to 15 percent slopes	1,653	0.4
801	Riverwash	398	0.1
811	Rock outcrop	1,617	0.4
821	Roloc-Drit association	367	0.1
831	Saralegui sand, 0 to 2 percent slopes	620	0.1
832	Saralegui sand, 2 to 8 percent slopes	3,911	0.9
833	Saralegui association	984	0.2
834	Saralegui-Haybourne-Reno association	1,923	0.4
841	Searles-Devada-Duco association	844	0.2
842	Searles-Burnborough-Duco association	3,794	0.9
843	Searles-Burnborough-Chen association	1,244	0.3
851	Settlemeyer clay loam	713	0.2
852	Settlemeyer clay loam, drained	463	0.1
854	Settlemeyer loam, drained	213	*
861	Shakespeare gravelly loam, 8 to 30 percent slopes	183	*
871	Shree very gravelly loam, 2 to 8 percent slopes	628	0.1
872	Shree very stony loam, 4 to 15 percent slopes	1,065	0.2
873	Shree-Settlemeyer association	1,036	0.2
874	Shree-Pung association	2,033	0.5
881	Springmeyer gravelly fine sandy loam, 4 to 15 percent slopes	1,713	0.4
882	Springmeyer stony fine sandy loam, 15 to 50 percent slopes	836	0.2
883	Springmeyer very stony fine sandy loam, 30 to 50 percent slopes	466	0.1
884	Springmeyer gravelly loam, 2 to 8 percent slopes	1,456	0.3
891	Stodick very stony fine sandy loam, 4 to 15 percent slopes	2,358	0.5

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
892	Stodick-Indiano association	1,169	0.3
901	Surgem-Olac-Cagle association	4,599	1.1
911	Theon very gravelly loam, 8 to 15 percent slopes	172	*
912	Theon very gravelly loam, 15 to 50 percent slopes	3,118	0.7
921	Nevador Variant fine sandy loam, 0 to 4 percent slopes	674	0.2
922	Nevador Variant loam, 4 to 15 percent slopes	329	0.1
923	Nevador Variant very gravelly loam, 4 to 8 percent slopes	265	0.1
931	Temo-Rock outcrop complex, 30 to 50 percent slopes	275	0.1
932	Temo-Rock outcrop complex, 50 to 70 percent slopes	493	0.1
941	Toiyabe-Rock outcrop complex, 30 to 50 percent slopes	3,336	0.8
942	Toiyabe-Rock outcrop complex, 50 to 75 percent slopes	3,904	0.9
951	Toll sand, 0 to 4 percent slopes	4,584	1.1
952	Toll sand, 4 to 15 percent slopes	3,807	0.9
953	Toll sand, clay substratum, 0 to 2 percent slopes	175	*
961	Burnborough-Glean association	1,021	0.2
962	Burnborough-Pernty-Glean association	1,993	0.5
963	Burnborough-Sup-Chen association	337	0.1
972	Trid-Drit association	330	0.1
973	Trid-Drit-Duco association	9,433	2.2
974	Trid-Roloc-Drit association	8,016	1.8
975	Trid-Roloc-Glean association	2,707	0.6
976	Trid-Roloc-Mottsville association	1,360	0.3
977	Trid-Roloc-Sup association	3,468	0.8
982	Turria loam	3,689	0.9
985	Turria clay loam, wet	1,702	0.4
986	Turria silty clay loam	423	0.1
992	Updike silty clay loam, moderately saline-alkali	591	0.1
993	Updike-Springmeyer association	878	0.2
994	Updike silty clay loam, strongly saline-alkali	305	0.1
1011	Verdico-Puett association	1,405	0.3
1012	Verdico-Uhaldi-Springmeyer association	3,162	0.7
1021	Veta very gravelly sandy loam, rarely flooded, 2 to 4 percent slopes	180	*
1031	Vicee-Rock outcrop complex, 50 to 75 percent slopes	913	0.2
1041	Voltaire silty clay loam, wet, strongly saline-alkali	1,727	0.4
1042	Voltaire silty clay	287	0.1
1044	Voltaire clay, slightly saline-alkali	684	0.2
1051	Voltaire Variant clay loam	554	0.1
1061	Washoe gravelly sandy loam, 0 to 2 percent slopes	1,955	0.4
1062	Washoe very gravelly sandy loam, 2 to 8 percent slopes	2,555	0.6
1063	Washoe cobbly sandy loam, 0 to 2 percent slopes	2,674	0.6
1066	Washoe-Reno association	359	0.1
1071	Corbett gravelly sand, 15 to 30 percent slopes	226	*
1072	Corbett-Toiyabe complex, 30 to 50 percent slopes	876	0.2
1073	Corbett-Toiyabe association	755	0.2
1081	Zephan association	709	0.2
1091	Uhaldi-Nosrac association	2,092	0.5
1101	Pung-Phing-Chalco association	2,240	0.5
1102	Pung-Pula-Uhaldi association	3,315	0.8
1111	Stucky extremely cobbly sandy loam, 8 to 15 percent slopes	414	0.1
1112	Stucky association	586	0.1
	Water	728	0.2
	Total	435,199	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Alfalfa hay	Grass-legume hay	Pasture	Oats	Barley
	Ton	Ton	AUM*	Bu	Bu
141 Brockliss	---	3.0	7.5	---	---
191 Cradlebaugh	---	4.5	11.0	---	65.0
192 Cradlebaugh	---	3.5	9.0	---	---
193 Cradlebaugh	---	4.0	10.0	---	---
194 Cradlebaugh	---	4.5	11.0	---	---
201, 202, 203 Dangberg	---	4.0	10.0	---	---
203 Dangberg	---	3.5	9.0	---	---
204 Dangberg	---	4.0	10.0	---	---
205 Dangberg	---	3.5	9.0	---	---
221 East Fork Variant	5.0	5.5	14.0	125.0	85.0
241 Dressler	4.5	5.0	12.5	110.0	75.0
242 Dressler	---	4.0	10.0	100.0	---
271, 272 East Fork	5.0	5.5	14.0	125.0	85.0
311, 314 Gardnerville	4.5	5.0	12.0	110.0	70.0
313, 315 Gardnerville	4.0	5.0	12.0	105.0	70.0
351 Godecke	---	4.5	11.0	---	60.0
392 Haybourne	4.5	5.0	12.0	110.0	70.0
393 Haybourne	4.5	5.0	12.0	110.0	70.0
401, 402 Heidtman	4.0	5.0	12.0	105.0	70.0
411, 413 Henningsen	4.5	5.0	12.0	---	---
412, 414 Henningsen	---	4.5	11.0	---	---
422 Henningsen Variant	4.5	5.0	11.0	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Grass-legume hay	Pasture	Oats	Barley
	Ton	Ton	AUM*	Bu	Bu
431**: Shalcar family	---	---	6.0	---	---
442 Holbrook	3.5	3.5	9.0	80.0	50.0
461 Hussman	---	5.0	12.0	105.0	60.0
462 Hussman	---	4.5	11.0		
463 Hussman	---	5.0	12.0	105.0	60.0
501 James Canyon	5.0	5.5	14.0	80.0	50.0
502 James Canyon	4.5	5.0	12.0	65.0	40.0
503 Kimmerling Variant	---	3.0	6.0	---	---
511 James Canyon Variant	---	5.0	12.0	---	---
512 James Canyon Variant	---	4.5	11.0	---	---
521 Job	4.5	5.0	12.0	100.0	65.0
523 Job	---	5.0	12.0	105.0	70.0
524 Job	---	5.0	12.0	100.0	65.0
531 Jubilee	---	1.0	11.0	---	---
532 Jubilee	---	---	9.0	---	---
533 Jubilee Variant	---	---	7.0	---	---
534 Jubilee-Dressler-Kimmerling	---	3.5	9.0	---	---
552 Kimmerling	---	3.0	7.0	---	---
553, 555 Kimmerling	---	3.0	7.5	---	---
621, 622 Niwot	---	4.0	10.0	---	---
641 Ophir	---	3.5	9.0	70.0	45.0
642 Ophir	---	3.0	7.5	60.0	40.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Grass-legume hay	Pasture	Oats	Barley
	Ton	Ton	AUM*	Bu	Bu
644: Ophir Variant	---	---	6.0	---	---
661, 662: Ormsby	4.5	5.0	12.0	100.0	65.0
831, 832: Saralegui	5.0	5.5	14.0	105.0	65.0
851: Settlemeyer	---	4.0	10.0	---	---
852: Settlemeyer	---	5.0	12.0	---	---
982, 985: Turria	5.0	5.5	14.0	125.0	85.0
1041: Voltaire	---	---	6.0	---	---
1042, 1044: Voltaire	---	5.0	12.0	90.0	65.0
1051: Voltaire Variant	---	---	6.0	---	---
1061: Washoe	5.0	5.5	14.0	120.0	80.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
101 Aldax	Shallow Loam 10-12" Pz 26-15	Favorable Normal Unfavorable	700 600 450	Thurber needlegrass Bottlebrush squirreltail Wyoming big sagebrush Indian ricegrass Antelope bitterbrush Green ephedra Douglas rabbitbrush	20 15 15 10 10 5 5
102*: Aldax	Shallow Loam 10-12" Pz 26-15	Favorable Normal Unfavorable	700 600 450	Thurber needlegrass Bottlebrush squirreltail Wyoming big sagebrush Indian ricegrass Antelope bitterbrush Green ephedra Douglas rabbitbrush	20 15 15 10 10 5 5
Indiano	Loamy 10-12" Pz 26-10	Favorable Normal Unfavorable	900 700 600	Thurber needlegrass Wyoming big sagebrush Basin wildrye Antelope bitterbrush Indian ricegrass Sandberg bluegrass Bottlebrush squirreltail	20 15 10 10 5 5 5
111 Borda	Loamy 10-12" Pz, 26-10	Favorable Normal Unfavorable	900 700 600	Thurber needlegrass Basin wildrye Wyoming big sagebrush Pine bluegrass Antelope bitterbrush Bottlebrush squirreltail Sandberg bluegrass	20 20 20 10 10 5 5
121*: Borda Variant	Claypan 12-18" Pz 26-39	Favorable Normal Unfavorable	500 300 200	Low sagebrush Thurber needlegrass Pine bluegrass Prairie junegrass Sandberg bluegrass Bottlebrush squirreltail Green ephedra Antelope bitterbrush Douglas rabbitbrush	20 15 10 10 5 5 5 5 5
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable Normal Unfavorable	350 250 150	Low sagebrush Thurber needlegrass Sandberg bluegrass Rabbitbrush Antelope bitterbrush Sedge	25 15 10 5 5 5
Burnborough Variant	Upland Brouse 14-18 Pz 26-40	Favorable Normal Unfavorable	1,500 1,300 800	Columbia needlegrass Antelope bitterbrush Mountain brome Western needlegrass Mountain big sagebrush Snowberry Curlleaf mountainmahogany	20 20 10 10 10 5 5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
122*:					
Borda Variant	Claypan 12-18" Pz 26-39	Favorable	500	Low sagebrush	20
		Normal	300	Thurber needlegrass	15
		Unfavorable	200	Pine bluegrass	10
				Prairie junegrass	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
123*:					
Borda Variant	Claypan 12-18" Pz 26-39	Favorable	500	Low sagebrush	20
		Normal	300	Thurber needlegrass	15
		Unfavorable	200	Pine bluegrass	10
				Prairie junegrass	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Columbia needlegrass	10
				Basin wildrye	10
				Spike-fescue	10
Chen	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Douglas rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
124*:					
Borda Variant	Claypan 12-18" Pz 26-39	Favorable	500	Low sagebrush	20
		Normal	300	Thurber needlegrass	15
		Unfavorable	200	Pine bluegrass	10
				Prairie junegrass	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Burnborough Variant	Upland Brouse 12-16" Pz 26-40	Favorable	1,500	Columbia needlegrass	20
		Normal	1,300	Antelope bitterbrush	20
		Unfavorable	800	Mountain brome	10
				Western needlegrass	10
				Mountain big sagebrush	10
				Snowberry	5
				Curlleaf mountainmahogany	5
Cassiro	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
151*:					
Cagle.					
Deven.					
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
154*:					
Cagle.					
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
155*:					
Cagle.					
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
Borda	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Basin wildrye	20
		Unfavorable	600	Wyoming big sagebrush	20
				Pine bluegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
156*:					
Cagle.					
Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Rock outcrop.					
181*:					
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
Chalco	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
182*:					
Chalco	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
Pula	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
183*:					
Chalco	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
201 Dangberg	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin big sagebrush	20
		Unfavorable	1,000	Basin wildrye	15
				Creeping wildrye	10
				Spiny hopsage	5
				Shadscale	5
211*:					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
212*:					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
212*:					
Koontz	Shallow Loam 10-12" Pz 26-15	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Green ephedra	5
				Douglas rabbitbrush	5
213*:					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
Burnborough Variant	Upland Brouse 12-18" Pz 26-40	Favorable	1,500	Columbia needlegrass	20
		Normal	1,300	Antelope bitterbrush	20
		Unfavorable	800	Mountain brome	10
				Western needlegrass	10
				Mountain big sagebrush	10
				Snowberry	5
				Curlleaf mountainmahogany	5
214*:					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
Rock outcrop.					
231*:					
Brockliss Variant	Loamy Bottom 8-12" Pz 26-30	Favorable	2,500	Basin wildrye	45
		Normal	2,000	Basin big sagebrush	15
		Unfavorable	1,500	Nevada bluegrass	10
Brockliss Variant	Wet Meadow 10-14" Pz 26-3	Favorable		Tufted hairgrass	30
		Normal		Nevada bluegrass	20
		Unfavorable		Meadow barley	15
				Alpine timothy	15
Dangberg	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin big sagebrush	20
		Unfavorable	1,000	Basin wildrye	15
				Creeping wildrye	10
				Spiny hopsage	5
				Shadscale	5
251*:					
Duco.					
Cagle.					
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
252*:					
Duco.					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
253*:					
Duco.					
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
254*:					
Duco.					
Nosrac	Loamy 12-14 Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
Burnborough Variant	Upland Brouse 14-18" Pz 26-40	Favorable	1,500	Columbia needlegrass	20
		Normal	1,300	Antelope bitterbrush	20
		Unfavorable	800	Mountain brome	10
				Western needlegrass	10
				Mountain big sagebrush	10
				Snowberry	5
				Curlleaf mountainmahogany	5
281 Fettic	Sodic Floodplain 8-10" Pz 26-13.	Favorable	800	Alkali sacaton	35
		Normal	700	Inland saltgrass	15
		Unfavorable	500	Basin wildrye	10
				Black greasewood	10
				Big saltbush	5
282 Fettic	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin big sagebrush	20
		Unfavorable	1,000	Basin wildrye	15
				Creeping wildrye	5
312 Gardnerville	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin wildrye	15
		Unfavorable	1,000	Basin big sagebrush	15
				Creeping wildrye	10
				Spiny hopsage	5
				Shadscale	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
321*:					
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
322*:					
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
Rock outcrop.					
331*:					
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Columbia needlegrass	10
				Basin wildrye	10
				Spike-fescue	10
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Spike-fescue	10
				Basin wildrye	10
				Columbia needlegrass	10
332*:					
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
Rubble land.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
334*:					
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
Sup	Mahogany Slopes 14-18" Pz 26-9	Favorable	1,000	Curlleaf mountainmahogany	60
		Normal	800	Pine bluegrass	5
		Unfavorable	600	Basin wildrye	5
				Arrowleaf balsamroot	5
				Mountain big sagebrush	5
				Common snowberry	5
Genoa	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
341*:					
Glenbrook	Shallow Granitic Upland 10-12" Pz 26-18.	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
Glenbrook	Shallow Granitic Upland 10-12" Pz 26-18.	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
342*:					
Glenbrook	Shallow Granitic Upland 10-12" Pz 26-18.	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
Rock outcrop.					
351 Godecke	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin wildrye	15
		Unfavorable	1,000	Basin big sagebrush	15
				Creeping wildrye	10
				Spiny hopsage	5
				Shadscale	5
381, 382 Greenbrae	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
				Green ephedra	5
391 Haybourne	Sandy 8-10" Pz 26-20	Favorable	800	Needleandthread	20
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Wyoming big sagebrush	15
				Thurber needlegrass	10
				Bottlebrush squirreltail	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
392, 393, 394: Haybourne	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Green ephedra	5
				Anderson peachbrush	5
442: Holbrook	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
443: Holbrook	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
444*:					
Holbrook	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
Glenbrook	Shallow Granitic Upland 10-12" Pz 26-18.	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
445*:					
Holbrook	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
Greenbrae	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
				Green ephedra	5
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
446*:					
Holbrook	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
446*:					
Verdico	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Canby bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
451*:					
Hyloc.					
Ister	Loamy 12-14" Pz 26-5	Favorable	1,100	Mountain big sagebrush	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Western needlegrass	20
				Basin wildrye	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
471	Dune 10-12" Pz 26-14	Favorable	800	Needleandthread	25
Incy		Normal	700	Antelope bitterbrush	25
		Unfavorable	600	Indian ricegrass	15
				Desert needlegrass	5
				Anderson peachbrush	5
				Green ephedra	5
				Rubber rabbitbrush	5
				Spiny hopsage	5
481, 482, 483	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
Indian Creek		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
485*:					
Indian Creek	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Haybourne	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Green ephedra	5
				Anderson peachbrush	5
486*:					
Indian Creek	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Littleleaf horsebrush	5
Cassiro	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight (Lb/acre)	Characteristic vegetation	Composition (Pct)
487*:					
Indian Creek Variant	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
Cassiro	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
488*:					
Indian Creek Variant	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
491 Indiano	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
534*:					
Jubilee	Moist Flood Plain 8-10" Pz 26-1.	Favorable	3,000	Creeping wildrye	50
		Normal	2,500	Basin wildrye	20
		Unfavorable	2,000	Nevada bluegrass	5
Dressler	Moist Flood Plain 8-10" Pz 26-1.	Favorable	3,000	Creeping wildrye	50
		Normal	2,500	Basin wildrye	20
		Unfavorable	2,000	Nevada bluegrass	5
Kimmerling	Moist Flood Plain 8-10" Pz 26-1.	Favorable	3,000	Creeping wildrye	50
		Normal	2,500	Basin wildrye	20
		Unfavorable	2,000	Nevada bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
541*:					
Softscrabble	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
Genoa	Mountain Ridges 14-18" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
561*:					
Koontz	Shallow Loam 10-12" Pz 26-15	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Douglas rabbitbrush	5
Sutro	Loamy 10-12" Pz 26-10	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Thurber needlegrass	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
562*:					
Koontz	Shallow Loam 10-12" Pz 26-15	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Green ephedra	5
				Douglas rabbitbrush	5
Sutro	Loamy 10-12" Pz 26-10	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Thurber needlegrass	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
581*:					
Loomer	South Slopes 6-8" Pz 26-41	Favorable	650	Low sagebrush	25
		Normal	500	Desert needlegrass	25
		Unfavorable	400	Nevada ephedra	10
				Spiny hopsage	5
				Bottlebrush squirreltail	5
Loomer	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
582*:					
Loomer	South Slopes 6-8" Pz 26-41	Favorable	650	Low sagebrush	25
		Normal	500	Desert needlegrass	25
		Unfavorable	400	Nevada ephedra	10
				Spiny hopsage	5
				Bottlebrush squirreltail	5
Olac	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	10
583*:					
Loomer	South Slope 6-8" Pz 26-41	Favorable	650	Low sagebrush	25
		Normal	500	Desert needlegrass	25
		Unfavorable	400	Nevada ephedra	10
				Spiny hopsage	5
				Bottlebrush squirreltail	5
Zephan	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
Olac	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	10
591*:					
Minneha.					
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Spike-fescue	10
				Basin wildrye	10
				Columbia needlegrass	10
592*:					
Minneha.					
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
Rock outcrop.					
601, 602, 603 Mottsville	Granitic Fans 10-12" Pz 26-8	Favorable	1,000	Needleandthread	20
		Normal	800	Antelope bitterbrush	20
		Unfavorable	600	Indian ricegrass	15
				Mountain big sagebrush	10
				Desert needlegrass	5
				Bottlebrush squirreltail	5
				Spineless horsebrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
604*:					
Mottsville	Granitic Upland 10-12" Pz 26-26.	Favorable	300	Wyoming big sagebrush	20
		Normal	250	Anderson peachbrush	20
		Unfavorable	200	Desert needlegrass	10
				Antelope bitterbrush	10
				Thurber needlegrass	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
Roloc	South Slopes 8-12" Pz 26-11	Favorable	800	Desert needlegrass	40
		Normal	700	Thurber needlegrass	10
		Unfavorable	600	Green ephedra	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
611, 612 Nevador	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Douglas rabbitbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Anderson peachbrush	5
631*:					
Olac	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	10
Ister	Loamy 12-14" Pz 26-5	Favorable	1,100	Mountain big sagebrush	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Western needlegrass	20
				Basin wildrye	10
				Antelope bitterbrush	5
				Sandberg bluegrass	5
Rock outcrop.					
651*:					
Oppio	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
				Bottlebrush squirreltail	5
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
671*:					
Pernty	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain big sagebrush	15
		Unfavorable	800	Antelope bitterbrush	10
				Mountain brome	10
				Snowberry	5
				Serviceberry	5
				Basin wildrye	5
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
Burnborough Variant	Upland Browse 12-16" Pz 26-40	Favorable	1,500	Columbia needlegrass	20
		Normal	1,300	Antelope bitterbrush	20
		Unfavorable	800	Mountain brome	10
				Western needlegrass	10
				Mountain big sagebrush	10
				Snowberry	5
				Curlleaf mountainmahogany	5
Chen	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Douglas rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
672*:					
Pernty.					
Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
673*:					
Pernty.					
Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Rock outcrop.					
681 Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
682 Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
683: Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
685*:					
Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
Chalco	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
691: Updike Variant	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin big sagebrush	20
		Unfavorable	1,000	Basin wildrye	15
				Creeping wildrye	10
				Shadscale	5
693*:					
Updike Variant	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	25
		Normal	1,100	Basin big sagebrush	20
		Unfavorable	1,000	Basin wildrye	15
				Creeping wildrye	10
				Shadscale	5
Playas.					
702: Perazzo	Gravelly Loam 4-6" Pz 27-18	Favorable	400	Indian ricegrass	25
		Normal	200	Shadscale	15
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
712, 713: Prey	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
721: Prey Variant	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
731: Job Variant	Sodic Flat 5-10" Pz 26-21	Favorable	800	Alkali sacaton	30
		Normal	700	Inland saltgrass	15
		Unfavorable	500	Black greasewood	10
				Basin wildrye	10
				Big saltbush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
741*:					
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
Chalco	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
742*:					
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
Pula	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Indian ricegrass	10
				Purple sage	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
743*:					
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
743*:					
Verdico	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Canby bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Haybourne	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Green ephedra	5
				Anderson peachbrush	5
744*:					
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
Verdico	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Canby bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
751*:					
Pula	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Cassiro	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Antelope bitterbrush	5
752*:					
Pula	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight (Lb/acre)	Characteristic vegetation	Composition (Pct)
752*:					
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
Pung	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
753*:					
Pula	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
Pung	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
762*:					
Pulcan	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Pine bluegrass	10
				Desert needlegrass	5
				Littleleaf horsebrush	5
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
771, 772: Rawe	Gravelly Loam 4-6" Pz 27-18	Favorable	400	Indian ricegrass	20
		Normal	200	Shadscale	15
		Unfavorable	100	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Bottlebrush squirreltail	5
781, 782: Reno	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Bottlebrush squirreltail	10
				Indian ricegrass	10
				Anderson peachbrush	5
				Green ephedra	5
				Douglas rabbitbrush	5
783: Reno	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Littleleaf horsebrush	5
784: Reno	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
785*:					
Phing Variant	Shallow Calcareous Loam 8-10" Pz 26-42.	Favorable	400	Black sagebrush	30
		Normal	300	Small rabbitbrush	10
		Unfavorable	200	Thurber needlegrass	10
				Sandberg bluegrass	10
				Bud sagebrush	5
Reno	Claypan 8-10" Pz" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
786*:					
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Littleleaf horsebrush	5
Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
Springmeyer	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
787*:					
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight (Lb/acre)	Characteristic vegetation	Composition (Pct)
787*: Saralegui	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Basin wildrye	5
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
788*: Reno	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Stucky	Claypan 6-8" Pz 26-47	Favorable	300	Low sagebrush	35
		Normal	200	Desert needlegrass	20
		Unfavorable	150	Littleleaf horsebrush	5
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
789*: Phing Variant	Shallow Calcareous Loam 8-10" Pz 26-42.	Favorable	400	Black sagebrush	30
		Normal	300	Small rabbitbrush	10
		Unfavorable	200	Thurber needlegrass	10
				Sandberg bluegrass	10
				Bud sagebrush	5
Zephan	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
791 Risue	Gravelly Loam 4-6" Pz 27-18	Favorable	400	Indian ricegrass	20
		Normal	200	Shadscale	15
		Unfavorable	100	Bailey greasewood	10
				Galleta	5
				Bottlebrush squirreltail	5
				Bud sagebrush	5
792 Risue	Gravelly Loamy 4-6" Pz 27-18	Favorable	400	Indian ricegrass	20
		Normal	200	Shadscale	15
		Unfavorable	100	Bailey greasewood	10
				Galleta	5
				Bottlebrush squirreltail	5
				Bud sagebrush	5
821*: Roloc	South Slope 8-12" Pz 26-11	Favorable	800	Desert needlegrass	40
		Normal	700	Thurber needlegrass	10
		Unfavorable	600	Green ephedra	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
831, 832 Saralegui	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Basin wildrye	5
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
				Green ephedra	5
				Douglas rabbitbrush	5
833*:					
Saralegui	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
Saralegui	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Basin wildrye	5
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
				Green ephedra	5
				Douglas rabbitbrush	5
834*:					
Saralegui	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
Haybourne	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Green ephedra	5
				Anderson peachbrush	5
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Littleleaf horsebrush	5
841*:					
Searles.					
Devada	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Duco.					
842*:					
Searles.					
Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
842*: Duco.					
843*: Searles.					
Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Chen	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Douglas rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5
854 Settlemeyer	Loamy Bottom 8-12" Pz 26-30	Favorable	2,500	Basin wildrye	45
		Normal	2,000	Basin big sagebrush	15
		Unfavorable	1,500	Nevada bluegrass	10
				Western wheatgrass	5
				Rubber rabbitbrush	5
871, 872 Shree	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
873*: Shree	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
Settlemeyer	Loamy Bottoms 8-12" Pz 26-30	Favorable	2,500	Basin wildrye	45
		Normal	2,000	Basin big sagebrush	15
		Unfavorable	1,500	Nevada bluegrass	10
				Western wheatgrass	5
				Rubber rabbitbrush	5
874*: Shree	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
874*:					
Pung	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
881, 882, 883, 884 Springmeyer	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
891 Stodick	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
892*:					
Stodick	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
Indiano	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
901*:					
Surgem	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Olac	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	10
Cagle.					
911, 912:					
Theon	Shallow Stony Loam 6-8" Pz 27-19.	Favorable	350	Shadscale	15
		Normal	200	Indian ricegrass	10
		Unfavorable	50	Bailey greasewood	10
				Desert needlegrass	10
				Bud sagebrush	10
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
921, 922, 923 Nevador Variant	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
951, 952, 953: Toll	Sandy 8-10" Pz 26-20	Favorable	800	Needleandthread	15
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Wyoming big sagebrush	15
				Bottlebrush squirreltail	10
				Thurber needlegrass	10
961*: Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
962*: Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Pernty.					
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike-fescue	10
963*: Burnborough	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Sup	Mahagony Slopes 14-18" Pz 26-9.	Favorable	1,000	Curlleaf mountainmahogany	60
		Normal	800	Pine bluegrass	5
		Unfavorable	600	Basin wildrye	5
				Arrowleaf balsamroot	5
				Mountain big sagebrush	5
				Common snowberry	5
Chen	Mountain Ridges 12-16" Pz 26-28.	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Douglas rabbitbrush	5
				Antelope bitterbrush	5
				Sedge	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
972*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
973*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Drit	Loamy 12-14 Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5
Duco.					
974*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Drit	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Sandberg bluegrass	5
				Arrowleaf balsamroot	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
975*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Glean	Loamy 14-18" Pz 26-38	Favorable	1,500	Western needlegrass	30
		Normal	1,200	Mountain big sagebrush	20
		Unfavorable	800	Basin wildrye	10
				Columbia needlegrass	10
				Spike fescue	10
976*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Mottsville	Granitic Upland 10-12" Pz 26-26.	Favorable	300	Wyoming big sagebrush	20
		Normal	250	Anderson peachbrush	20
		Unfavorable	200	Desert needlegrass	10
				Antelope bitterbrush	10
				Thurber needlegrass	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
977*:					
Trid	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
977*:					
Roloc	Granitic Upland 12-14" Pz 26-46.	Favorable	800	Thurber needlegrass	20
		Normal	600	Mountain big sagebrush	15
		Unfavorable	400	Indian ricegrass	10
				Antelope bitterbrush	10
				Pine bluegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Currant	5
				Green ephedra	5
Sup	Mahogany Slopes 14-18" Pz 26-9	Favorable	1,000	Curlleaf mountainmahogany	60
		Normal	800	Pine bluegrass	5
		Unfavorable	600	Basin wildrye	5
				Arrowleaf balsamroot	5
				Mountain big sagebrush	5
				Common snowberry	5
982, 985 Turria	Deep Silty Fan 8-10" Pz 26-32	Favorable	1,500	Basin wildrye	30
		Normal	1,200	Fourwing saltbush	20
		Unfavorable	900	Indian ricegrass	10
				Big saltbush	10
				Western wheatgrass	10
986 Turria	Silty 8-10" Pz 26-31	Favorable	550	Winterfat	45
		Normal	450	Indian ricegrass	15
		Unfavorable	300	Fourwing saltbush	10
				Sandberg bluegrass	5
				Spiny hopsage	5
992 Updike	Sodic Terrace 8-10" Pz 26-12	Favorable	1,200	Black greasewood	20
		Normal	1,100	Basin big sagebrush	15
		Unfavorable	1,000	Basin wildrye	15
				Spiny hopsage	5
				Shadscale	5
				Creeping wildrye	5
993*:					
Updike	Wet Clay Basin 8-12" Pz 26-36	Favorable	700	Baltic rush	50
		Normal	500	Mat muhly	20
		Unfavorable	300	Inland saltgrass	10
				Silver sagebrush	10
Springmeyer	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
994 Updike	Sodic Flats 5-10" Pz 26-21	Favorable	600	Black greasewood	55
		Normal	500	Basin wildrye	10
		Unfavorable	300	Shadscale	5
				Alkali sacaton	5
				Inland saltgrass	5
1011*:					
Verdico	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Pine bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1011*:					
Puett	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Desert needlegrass	15
		Normal	150	Wyoming big sagebrush	15
		Unfavorable	100	Indian ricegrass	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Low sagebrush	5
				Douglas rabbitbrush	5
				Purple sage	5
1012*:					
Verdico	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Pine bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
Springmeyer	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
1021 Veta	Wash 8-12" Pz 26-34	Favorable	1,000	Basin wildrye	30
		Normal	800	Basin big sagebrush	20
		Unfavorable	600	Antelope bitterbrush	10
				Wheatgrass	10
				Anderson peachbrush	5
1041 Voltaire	Wet Sodic Bottom 8-10" Pz 26-2	Favorable	2,000	Inland saltgrass	70
		Normal	1,700	Black greasewood	5
		Unfavorable	1,200		
1042 Voltaire	Wet Sodic Bottom 8-10" Pz 26-2	Favorable	2,000	Inland saltgrass	75
		Normal	1,700	Alkali seepweed	5
		Unfavorable	1,200	Black greasewood	5
1044 Voltaire	Sodic Floodplain 8-10" Pz 26-13.	Favorable	800	Alkali sacaton	35
		Normal	700	Inland saltgrass	15
		Unfavorable	500	Black greasewood	10
				Basin wildrye	10
				Big saltbush	5
1051 Voltaire Variant	Wet Sodic Bottom 8-10" Pz 26-2	Favorable	2,000	Inland saltgrass	60
		Normal	1,700	Alkali seepweed	5
		Unfavorable	1,200	Black greasewood	5
1062 Washoe	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	500	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
1063 Washoe	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5
1066*:					
Washoe	Loamy 8-10" Pz 26-16	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5
Reno	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
1081*:					
Zephan	Claypan 8-10" Pz 26-25	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
Zephan	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	30
		Normal	300	Thurber needlegrass	25
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
1091*:					
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
Nosrac	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Sandberg bluegrass	5
1101*:					
Pung	Claypan 10-12" Pz 26-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Phing	Claypan 8-10" Pz 26-25	Favorable	400	Low sagebrush	25
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1101*:					
Chalco	Eroded Slopes 8-12" Pz 26-29	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Indian ricegrass	10
				Bottlebrush squirreltail	10
1102*:					
Pung	Claypan 10-12" Pz 25-23	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Pine bluegrass	10
				Bottlebrush squirreltail	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Pula	Loamy 10-12" Pz 26-10	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Uhaldi	Loamy 12-14" Pz 26-5	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	20
				Basin wildrye	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
1111, 1112*:					
Stucky	Claypan 6-8" Pz 26-47	Favorable	300	Low sagebrush	35
		Normal	200	Desert needlegrass	20
		Unfavorable	150	Littleleaf horsebrush	5
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
				Douglas rabbitbrush	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
151*:								
Cagle	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
Deven	3x	Slight	Moderate	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Nosrac.								
152*:								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
153*:								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
Rock outcrop.								
154*:								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Nosrac.								
155*:								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Nosrac.								
Borda.								
156*:								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
Burnborough.								
Rock outcrop.								
161*:								
Witefels	4r	Slight	Moderate	Moderate	Moderate	Jeffrey pine White fir California red fir	60 60 60	Jeffrey pine, white fir, California red fir.
Rock outcrop.								
162*, 163*, 164*:								
Witefels	4r	Moderate	Moderate	Moderate	Moderate	Jeffrey pine White fir California red fir	60 60 60	Jeffrey pine, white fir, California red fir.
Rock outcrop.								

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
165*:								
Witefels	4r	Moderate	Moderate	Moderate	Moderate	Jeffrey pine	60	Jeffrey pine, white fir, California red fir.
						White fir	60	
						California red fir	60	
Temo	5x	Moderate	Severe	Severe	Moderate	Jeffrey pine	45	Jeffrey pine, western white pine, California red fir.
						Western white pine	35	
						California red fir	35	
251*:								
Duco	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon	35	
						Utah juniper	35	
Cagle	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon	35	
						Utah juniper	35	
Nosrac.								
252*:								
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon	35	
						Utah juniper	35	
Deven	3x	Slight	Moderate	Moderate	Moderate	Singleleaf pinyon	35	
						Utah juniper	35	
Nosrac.								
253*:								
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon	35	
						Utah juniper	35	
Nosrac.								
254*:								
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon	35	
						Utah juniper	35	
Nosrac.								
Burnborough Variant.								
255*:								
Duco	3x	Severe	Moderate	Moderate	Slight	Singleleaf pinyon	35	Singleleaf pinyon, Utah juniper.
						Utah juniper	35	
Searles	2x	Severe	Moderate	Slight	Slight	Singleleaf pinyon	50	
						Utah juniper	50	
292*:								
Vicee Variant	1x	Severe	Moderate	Moderate	Moderate	California red fir	62	California red fir.
Rock outcrop.								
301*:								
Franktown	3d	Severe	Severe	Severe	Slight	Jeffrey pine	42	Jeffrey pine.
Rubble land.								
Rock outcrop.								
362*:								
Gralic	5x	Moderate	Severe	Moderate	Moderate	California red fir	25	California red fir.
Gralic	5x	Slight	Severe	Moderate	Moderate	California red fir	25	California red fir.
363*:								
Gralic	5x	Moderate	Severe	Moderate	Moderate	California red fir	25	California red fir.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
363*:								
Rock outcrop.								
371 Graylock	4f	Slight	Severe	Severe	Moderate	California red fir	28	California red fir.
372 Graylock	4r	Slight	Severe	Severe	Moderate	California red fir	28	California red fir.
451*:								
Hyloc	3d	Slight	Slight	Severe	Slight	Singleleaf pinyon Utah juniper	25 25	
Ister.								
571*:								
Kram	3d	Severe	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	25 25	
Puett Variant.	3r	Moderate	Moderate	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
591*:								
Minneha	3r	Moderate	Severe	Severe	Severe	Singleleaf pinyon Utah juniper	46 46	
Drit.								
Glean.								
592*:								
Minneha	3r	Moderate	Severe	Severe	Severe	Singleleaf pinyon Utah juniper	46 46	
Drit.								
Rock outcrop.								
672*:								
Pernty	3d	Moderate	Severe	Moderate	Slight	Singleleaf pinyon Utah juniper	48 48	
Burnborough.								
Glean.								
673*:								
Pernty	3d	Severe	Severe	Moderate	Slight	Singleleaf pinyon Utah juniper	48 48	
Burnborough.								
Rock outcrop.								
841*:								
Searles	2x	Severe	Moderate	Slight	Slight	Singleleaf pinyon Utah juniper	50 50	
Devada.								
Duco	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
842*:								
Searles	2x	Severe	Moderate	Slight	Slight	Singleleaf pinyon Utah juniper	50 50	
Burnborough.								

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Common trees	Site index	
842*:								
Duco	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
843*:								
Searles	2x	Moderate	Moderate	Slight	Slight	Singleleaf pinyon Utah juniper	50 50	
Burnborough.								
Chen.								
861 Shakespeare	3w	Moderate	Moderate	Moderate	Slight	California red fir Lodgepole pine	41 92	California red fir.
901*:								
Surgem.								
Olac.								
Cagle	3x	Severe	Severe	Moderate	Moderate	Singleleaf pinyon Utah juniper	35 35	
931*, 932*:								
Temo	5x	Moderate	Severe	Severe	Moderate	Jeffrey pine Western white pine California red fir	45 35 35	Jeffrey pine, western white pine, California red fir.
Rock outcrop.								
941*, 942*:								
Toiyabe	7x	Moderate	Severe	Severe	Moderate	Jeffrey pine	35	Jeffrey pine.
Rock outcrop.								
962*:								
Burnborough.								
Pernty	3d	Severe	Severe	Moderate	Slight	Singleleaf pinyon Utah juniper	48 48	
Glean.								
973*:								
Trid.								
Drit.								
Duco	3x	Slight	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	
1031*:								
Vicee	3r	Severe	Severe	Moderate	Slight	Jeffrey pine	89	Jeffrey pine.
Rock outcrop.								
1071 Corbett.	5s	Slight	Moderate	Severe	Severe	Jeffrey pine	62	
1072*:								
Corbett	5s	Moderate	Severe	Severe	Severe	Jeffrey pine	62	
Toiyabe	7x	Moderate	Severe	Severe	Moderate	Jeffrey pine	35	Jeffrey pine.
1073*:								
Corbett	5s	Slight	Moderate	Severe	Severe	Jeffrey pine	62	
Toiyabe	7d	Slight	Slight	Severe	Moderate	Jeffrey pine	35	Jeffrey pine.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
141---------------- Brockliss	Cotoneaster, forsythia.	Amur maple, bladdersenna.	Hawthorn, Siberian crabapple.	Blue spruce, green ash.	American elm, poplar.
191---------------- Cradlebaugh	Big saltbush, skunkbush sumac.	Amur honeysuckle, bladdersenna.	Russian-olive, Russian mulberry.	Honeylocust, golden willow.	Poplar, American elm.
192---------------- Cradlebaugh	Big saltbush, fourwing saltbush.	Arroyo willow, coyote willow.	Russian-olive, Russian mulberry.	Golden willow, green ash.	Poplar, robusta cottonwood.
193, 194----------- Cradlebaugh	Fourwing saltbush, big saltbush.	Coyote willow, silver buffaloberry.	Russian-olive, common chokecherry.	Siberian elm, golden willow.	Poplar, robusta cottonwood.
201, 202, 203------ Dangberg	Fourwing saltbush, big saltbush.	Arroyo willow, silver buffaloberry.	Russian-olive, common chokecherry.	Siberian elm, green ash.	Poplar, Fremont cottonwood.
204, 205----------- Dangberg	Fourwing saltbush, big saltbush.	Silver buffaloberry, desertwillow.	Russian-olive, common chokecherry.	Siberian elm, green ash.	Poplar, Fremont cottonwood.
221---------------- East Fork Variant	Sierra currant, golden currant.	Lilac, Siberian peashrub.	Hawthorn, common chokecherry.	Green ash, golden willow.	Robusta cottonwood, Lombardy poplar.
241---------------- Dressler	Cotoneaster, forsythia.	Siberian peashrub, arroyo willow.	Russian-olive, Siberian crabapple.	Golden willow, honeylocust.	Poplar, robusta cottonwood.
242---------------- Dressler	Cotoneaster, forsythia.	Siberian peashrub, redosier dogwood, arroyo willow.	Russian-olive, Siberian crabapple.	Golden willow, green ash.	Poplar, robusta cottonwood.
271, 272----------- East Fork	Golden currant, skunkbush sumac.	Amur maple, blueberry elder.	Utah juniper, common chokecherry.	Blue spruce, Siberian elm.	American elm, Fremont cottonwood.
281, 282----------- Fettic	Big saltbush, fourwing saltbush.	Silver buffaloberry, arroyo willow.	Russian-olive, common chokecherry.	Golden willow, green ash.	Robusta cottonwood, poplar.
311---------------- Gardnerville	Big saltbush, cotoneaster.	Silver buffaloberry, lilac.	Common chokecherry, Russian-olive.	Green ash, narrowleaf cottonwood.	Robusta cottonwood, lombardy poplar.
312---------------- Gardnerville	Big saltbush, common jupiter.	Silver buffaloberry, lilac.	Common chokecherry, Russian-olive.	Green ash, narrowleaf cottonwood.	Robusta cottonwood, Lombardy poplar.
313---------------- Gardnerville	Big saltbush, skunkbush sumac.	Silver buffaloberry, American plum.	Common chokecherry, Russian-olive.	Golden willow, honeylocust.	Poplar, Fremont cottonwood.
314---------------- Gardnerville	Big saltbush, cotoneaster.	Silver buffaloberry, lilac.	Common chokecherry, Russian-olive.	Green ash, narrowleaf cottonwood.	Robusta cottonwood, Lombardy poplar.
315---------------- Gardnerville	Big saltbush, skunkbush sumac.	American plum, silver buffaloberry.	Russian-olive, common chokecherry.	Golden willow, honeylocust.	Poplar, Fremont cottonwood.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
351 Godecke	Big saltbush, fourwing saltbush.	Arroyo willow	Russian-olive, common chokecherry.	Golden willow, Siberian elm.	Poplar, robusta cottonwood.
381, 382 Greenbrae	Forsythia, cotoneaster.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
391, 392, 393 Haybourne	Skunkbush sumac, common juniper.	Lilac, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, ponderosa pine.	Lombardy poplar, poplar.
394 Haybourne	Snowbrush ceanothus, common juniper.	Amur honeysuckle, flowering crabapple.	Singleleaf pinyon, hawthorn.	Japanese black pine.	Poplar, American elm.
401 Heidtman	Golden currant, skunkbush sumac.	Siberian peashrub, lilac.	Utah juniper, Rocky Mountain juniper.	Green ash, golden willow.	Fremont cottonwood, Lombardy poplar.
402 Heidtman	Golden currant, skunkbush sumac.	Siberian peashrub, lilac.	Utah juniper, common chokecherry.	Green ash, golden willow.	Fremont cottonwood, Lombardy poplar.
411, 412, 413, 414 Henningsen	Golden currant, common juniper.	Amur maple, lilac	Common chokecherry, hawthorn.	Blue spruce, green ash.	American elm, Lombardy poplar.
422 Henningsen Variant	Cotoneaster, forsythia.	Amur honeysuckle, bladdersenna.	Hawthorn, Siberian crabapple.	Green ash	Poplar, American elm.
442 Holbrook	Skunkbush sumac, snowbrush ceanothus.	Mexican cliffrose, American plum.	Siberian crabapple, Utah juniper.	Narrowleaf cottonwood, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
443 Holbrook	Skunkbush sumac, snowbrush ceanothus.	American plum, Mexican cliffrose.	Siberian crabapple, Utah juniper.	Narrowleaf cottonwood. Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
444*: Holbrook	Skunkbush sumac, snowbrush ceanothus.	Mexican cliffrose, American plum.	Siberian crabapple, Utah juniper.	Narrowleaf cottonwood, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
Glenbrook.					
445*: Holbrook	Skunkbush sumac, snowbrush ceanothus.	American plum, Mexican cliffrose.	Siberian crabapple, Utah juniper.	Narrowleaf cottonwood, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
Greenbrae	Forsythia, cotoneaster.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
Reno.					
446*: Holbrook	Skunkbush sumac, snowbrush ceanothus.	American plum, Mexican cliffrose.	Siberian crabapple, Utah juniper.	Narrowleaf cottonwood, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
Verdico.					

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
461 Hussman	Golden currant, sierra currant.	Lilac, Siberian peashrub.	Common chokecherry, Russian-olive.	Green ash, Siberian elm.	Fremont cottonwood, Lombardy poplar.
462 Hussman	Big saltbush, fourwing saltbush.	Arroyo willow, silver buffaloberry.	Russian mulberry, Russian-olive.	Golden willow, Siberian elm.	Poplar, Fremont cottonwood.
463 Hussman	Common juniper, skunkbush sumac.	Lilac, arroyo willow.	Russian-olive, common chokecherry.	Green ash, golden willow.	American elm, Lombardy poplar.
485*: Indian Creek.					
Haybourne	Skunkbush sumac, common juniper.	Lilac, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, ponderosa pine.	Lombardy poplar, poplar.
501, 502 James Canyon	Golden currant, skunkbush sumac.	Amur honeysuckle, blueberry elder.	Hawthorn, Siberian crabapple.	Honeylocust, golden willow.	Lombardy poplar, Fremont cottonwood.
503 Kimmerling Variant	Cotoneaster	Arroyo willow, redosier dogwood, coyote willow.	Russian-olive	Golden willow	Fremont cottonwood, robusta cottonwood.
511, 512 James Canyon Variant	Golden currant, cotoneaster.	Lilac, arroyo willow.	Russian-olive	Golden willow, honeylocust.	Poplar, robusta cottonwood.
521 Job	Cotoneaster, forsythia.	Amur maple, bladdersenna.	Hawthorn, Siberian crabapple.	Green ash, black locust.	American elm, Fremont cottonwood.
523 Job	Cotoneaster	Bladdersenna, blueberry elder.	Russian-olive, hawthorn.	Golden willow, blue spruce.	Fremont cottonwood,
524 Job	Big saltbush, fourwing saltbush.	Arroyo willow, coyote willow.	Russian-olive, common chokecherry.	Golden willow, narrowleaf cottonwood.	Fremont cottonwood, poplar.
532 Jubilee	Cotoneaster	Coyote willow, redosier dogwood, arroyo willow.	Common chokecherry, Russian mulberry.	Golden willow, narrowleaf cottonwood.	Fremont cottonwood, Lombardy poplar.
533 Jubilee Variant	Cotoneaster	Arroyo willow, redosier dogwood, Amur maple.	Russian-olive, hawthorn.	Golden willow, narrowleaf cottonwood.	Poplar, Fremont cottonwood.
534*:					
Jubilee	Cotoneaster	Coyote willow, redosier dogwood, arroyo willow.	Common chokecherry, Russian mulberry.	Golden willow, narrowleaf cottonwood.	Fremont cottonwood, Lombardy poplar.
Dressler	Cotoneaster	Siberian peashrub, redosier dogwood, arroyo willow.	Russian-olive, Siberian crabapple.	Golden willow, green ash.	Poplar, robusta cottonwood.
Kimmerling	Cotoneaster	Arroyo willow, coyote willow.	Russian-olive, Russian mulberry.	Green ash, honeylocust.	Lombardy poplar, robusta cottonwood.
552 Kimmerling	Cotoneaster	Arroyo willow, redosier dogwood, coyote willow.	Russian-olive	Golden willow, narrowleaf cottonwood.	Lombardy poplar.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
553 Kimmerling	Cotoneaster	Arroyo willow, coyote willow.	Russian-olive, Russian mulberry.	Green ash, honeylocust.	Lombardy poplar, robusta cottonwood.
555 Kimmerling	Cotoneaster	Arroyo willow, silver buffaloberry, redosier dogwood.	Russian-olive, Russian mulberry.	Green ash, honeylocust, golden willow.	Lombardy poplar, robusta cottonwood.
601, 602 Mottsville	Skunkbush sumac, common juniper.	Flowering crabapple.	Rocky Mountain juniper, Utah juniper.	Siberian elm, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
603 Mottsville	Snowbrush ceanothus, skunkbush sumac.	Amur honeysuckle, flowering crabapple.	Hawthorn, singleleaf pinyon.	Black locust, common hackberry.	American elm, poplar.
604*:					
Mottsville	Skunkbush sumac, common juniper.	Flowering crabapple.	Rocky Mountain juniper, Utah juniper.	Siberian elm, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
Drit.					
Roloc.					
621 Niwot	Golden currant	Redosier dogwood, lilac, arroyo willow.	Russian-olive, Siberian crabapple.	Golden willow, green ash.	Poplar, robusta cottonwood.
622 Niwot	Cotoneaster, golden currant.	Lilac, arroyo willow.	Russian-olive, common chokecherry.	Golden willow, green ash.	Poplar, robusta cottonwood.
641, 642 Ophir	Cotoneaster	Siberian peashrub, silver buffaloberry.	Rocky Mountain juniper, Russian-olive.	Golden willow, narrowleaf cottonwood.	White poplar, white willow.
661, 662 Ormsby	Golden currant, skunkbush sumac.	Lilac, arroyo willow.	Common chokecherry, Utah juniper.	Green ash, golden willow.	American elm, poplar.
691 Updike Variant	Fourwing saltbush, big saltbush.	Coyote willow, arroyo willow.	Russian-olive, Russian mulberry.	Siberian elm, narrowleaf cottonwood.	Poplar, robusta cottonwood.
693*:					
Updike Variant	Fourwing saltbush, big saltbush.	Coyote willow, arroyo willow.	Russian-olive, Russian mulberry.	Siberian elm, narrowleaf cottonwood.	Poplar, robusta cottonwood.
Playas.					
712 Prey	Common juniper, golden currant.	Siberian peashrub, lilac.	Utah juniper, Rocky Mountain juniper.	Honeylocust, green ash.	Lombardy poplar, Fremont cottonwood.
713 Prey	Snowbrush ceanothus, skunkbush sumac.	Amur honeysuckle, Utah serviceberry.	Singleleaf pinyon, Siberian crabapple.	Black locust, Japanese black pine.	American elm, poplar.
743*:					
Puett.					
Verdico.					
Haybourne	Skunkbush sumac, common juniper.	Lilac, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, ponderosa pine.	Lombardy poplar, poplar.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
786*:					
Reno.					
Phing.					
Springmeyer	Forsythia	Lilac, American plum.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	Poplar, American elm.
751*:					
834*:					
Saralegui	Snowbrush ceanothus, forsythia.	Amur honeysuckle, flowering crabapple.	Singleleaf pinyon, hawthorn.	Black locust, common hackberry.	American elm.
Haybourne	Skunkbush sumac, common juniper.	Lilac, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, ponderosa pine.	Lombardy poplar, poplar.
Reno.					
852 Settlemeyer	Golden currant, skunkbush sumac.	Silver buffaloberry, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	Siberian elm, green ash.	Fremont cottonwood, Lombardy poplar.
854 Settlemeyer	Golden currant, skunkbush sumac.	Silver buffaloberry, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	Siberian elm, green ash.	Fremont cottonwood, Lombardy poplar.
873*:					
Shree.					
Settlemeyer	Golden currant, skunkbush sumac.	Silver buffaloberry, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	Siberian elm, green ash.	Fremont cottonwood, Lombardy poplar.
881, 882, 883, 884 Settlemeyer	Forsythia, cotoneaster.	Lilac, American plum.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	Poplar, American elm.
951, 952 Toll	Skunkbush sumac, snowbrush ceanothus.	Utah serviceberry, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, Siberian elm.	Fremont cottonwood, Lombardy poplar.
976*:					
Trid.					
Roloc.					
Mottsville	Skunkbush sumac, common juniper.	Flowering crabapple.	Rocky Mountain juniper, Utah juniper.	Siberian elm, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
982 Turria	Common juniper, golden currant.	American plum, Amur honeysuckle.	Rocky Mountain juniper, Siberian crabapple.	Blue spruce, green ash.	American elm, poplar.
985 Turria	Common juniper, golden currant.	Lilac, Amur maple	Rocky Mountain juniper, common chokecherry.	Blue spruce, green ash.	Robusta cottonwood, poplar.
986 Turria	Common juniper, golden currant.	American plum, Amur honeysuckle.	Rocky Mountain juniper, Siberian crabapple.	Blue spruce, green ash.	American elm, poplar.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
1012*:					
Verdico.					
Uhaldi.					
Springmeyer	Forsythia, cotoneaster.	Lilac, American plum.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	Poplar, American elm.
1042, 1044 Voltaire	Big saltbush, fourwing saltbush.	Arroyo willow, coyote willow.	Russian-olive, Russian mulberry.	Green ash, golden willow.	Robusta cottonwood, poplar.
1051 Voltaire Variant	Fourwing saltbush, pyracantha.	Silver buffaloberry, arroyo willow.	Russian-olive, common chokecherry.	Golden willow, green ash.	Fremont cottonwood, poplar.
1061 Washoe	Forsythia, golden currant.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
1062. Washoe					
1063 Washoe	Forsythia, golden currant.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
1066*:					
Washoe	Forsythia, golden currant.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
Reno.					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
101 Aldax	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: slope.
102*:				
Aldax	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
111 Borda	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
121*:				
Borda Variant	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: small stones.
Genoa	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Burnborough Variant	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
122*:				
Borda Variant	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
Borda Variant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
Glean	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Moderate: large stones, slope.
123*:				
Borda Variant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
Glean	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.
Chen	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
124*:				
Borda Variant	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
Burnborough Variant	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Cassiro	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
141 Brockliss	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.
151*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
Deven	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock, slope.	Severe: large stones.
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
152*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
153*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rock outcrop.				
154*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
155*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
155*:				
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Borda	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
156*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
161*:				
Witefels	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.
Rock outcrop.				
162*:				
Witefels	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: too sandy, slope.
Rock outcrop.				
163*, 164*:				
Witefels	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
165*:				
Witefels	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, small stones.	Severe: too sandy, slope.
Temo	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: slope, small stones, too sandy.	Severe: too sandy, slope.
181*:				
Chalco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope.	Moderate: large stones.
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
182*: Chalco	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
Pula	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
183*: Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.
Chalco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope.	Moderate: large stones.
191, 192 Cradlebaugh	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight.
193, 194 Cradlebaugh	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Slight.
201 Dangberg	Moderate: percs slowly, dusty, excess salt.	Moderate: excess salt, percs slowly, dusty.	Moderate: percs slowly, dusty, excess salt.	Severe: erodes easily.
202, 203 Dangberg	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Moderate: too clayey.
204, 205 Dangberg	Severe: flooding, wetness, excess salt.	Moderate: excess salt.	Severe: wetness, excess salt.	Moderate: wetness, too clayey.
211*: Devada	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
Drit	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Roloc	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
212*: Devada	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
Koontz	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
213*:				
Devada	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
Burnborough Variant	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
214*:				
Devada	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock, slope.	Severe: large stones, slope.
Rock outcrop.				
221 East Fork Variant	Severe: flooding.	Slight	Moderate: small stones.	Slight.
231*:				
Brockliss Variant	Severe: flooding, small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Brockliss Variant	Severe: flooding, small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Dangberg	Moderate: percs slowly, dusty, excess salt.	Moderate: excess salt, percs slowly, dusty.	Moderate: percs slowly, dusty, excess salt.	Severe: erodes easily.
241 Dressler	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight.
242 Dressler	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness, flooding.	Slight.
251*:				
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
252*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
252*:				
Devada	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
253*:				
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
254*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Burnborough Variant	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
255*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
Searles	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
261*:				
Dumps.				
Pits.				
271 East Fork	Severe: flooding.	Slight	Slight	Severe: erodes easily.
272 East Fork	Severe: flooding.	Slight	Slight	Slight.
281 Fettic	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Slight.
282 Fettic	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Moderate: too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
292*:				
Vicee Variant	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.
Rock outcrop.				
301*:				
Franktown	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Rubble land.				
Rock outcrop.				
311, 312 Gardnerville	Severe: flooding.	Slight	Slight	Slight.
313 Gardnerville	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Slight.
314 Gardnerville	Severe: flooding.	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.
315 Gardnerville	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Moderate: too clayey.
321*:				
Genoa	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.
322*:				
Genoa	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.
Rock outcrop.				
331*:				
Glean	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Genoa	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Glean	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
332*: Glean	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.
Genoa	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Rubble land.				
334*: Glean	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.
Sup	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Genoa	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
341*: Glenbrook	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: too sandy.
Glenbrook	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: too sandy.
342*: Glenbrook	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.
Rock outcrop.				
351 Godecke	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: erodes easily.
362*: Gralic	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Gralic	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
363*: Gralic	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Rock outcrop.				

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
371, 372 Graylock	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
381 Greenbrae	Slight	Slight	Moderate: slope.	Slight.
382 Greenbrae	Moderate: small stones.	Moderate: small stones.	Severe: slope.	Slight.
391 Haybourne	Severe: flooding, too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.
392 Haybourne	Severe: flooding.	Slight	Moderate: small stones.	Slight.
393 Haybourne	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
394 Haybourne	Severe: flooding.	Slight	Moderate: small stones.	Slight.
401 Heidtman	Severe: flooding.	Moderate: excess salt.	Moderate: flooding.	Slight.
402 Heidtman	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.
411 Henningsen	Severe: flooding.	Moderate: dusty.	Moderate: small stones, flooding.	Severe: erodes easily.
412 Henningsen	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Severe: erodes easily.
413 Henningsen	Severe: flooding.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.
414 Henningsen	Severe: flooding.	Moderate: wetness, small stones.	Severe: small stones.	Slight.
422 Henningsen Variant	Severe: flooding.	Slight	Moderate: flooding.	Slight.
431* Shalcar family	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.
442 Holbrook	Severe: flooding.	Moderate: small stones.	Severe: slope, small stones.	Slight.
443 Holbrook	Severe: flooding.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Slight.
444*:				
Holbrook	Severe: flooding.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
444*:				
Glenbrook	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: too sandy.
445*:				
Holbrook	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
Greenbrae	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Slight.
Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
446*:				
Holbrook	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, depth to rock.	Slight.
451*:				
Hyloc	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
Ister	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
461 Hussman	Severe: flooding.	Moderate: excess salt.	Moderate: flooding, excess salt.	Slight.
462 Hussman	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Slight.
463 Hussman	Severe: flooding.	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.
471 Incy	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.
481 Indian Creek	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Slight.
482 Indian Creek	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan, slope, small stones.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
483 Indian Creek	Severe: large stones, cemented pan.	Severe: large stones, cemented pan.	Severe: cemented pan, large stones, small stones.	Severe: large stones.
485*:				
Indian Creek	Severe: large stones, cemented pan.	Severe: large stones, cemented pan.	Severe: cemented pan, large stones, small stones.	Severe: large stones.
Haybourne	Severe: flooding.	Slight	Severe: small stones.	Slight.
486*:				
Indian Creek	Severe: large stones, cemented pan.	Severe: large stones, cemented pan.	Severe: cemented pan, large stones, small stones.	Severe: large stones.
Reno	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Moderate: large stones.
Cassiro	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
487*:				
Indian Creek Variant	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Severe: slope, small stones.	Severe: slope, small stones.
Cassiro	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
488*:				
Indian Creek Variant	Severe: slope, small stones, cemented pan.	Severe: slope, small stones, cemented pan.	Severe: large stones, slope, small stones.	Severe: slope.
Roloc	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
491 Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
501 James Canyon	Slight	Slight	Moderate: slope, small stones.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
502 James Canyon	Slight	Slight	Severe: slope.	Slight.
503 Kimmerling Variant	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.
511 James Canyon Variant	Severe: excess salt.	Severe: excess salt.	Severe: excess salt.	Moderate: wetness.
512 James Canyon Variant	Severe: excess salt.	Severe: excess salt.	Severe: slope, excess salt.	Slight.
521 Job	Severe: flooding.	Moderate: excess salt, dusty.	Moderate: flooding, dusty, excess salt.	Severe: erodes easily.
523, 524 Job	Severe: flooding.	Moderate: wetness, excess salt, dusty.	Moderate: wetness, flooding, dusty.	Severe: erodes easily.
531 Jubilee	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.
532 Jubilee	Severe: flooding, wetness, too clayey.	Severe: too clayey.	Severe: too clayey, wetness.	Severe: too clayey.
533 Jubilee Variant	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.
534*:				
Jubilee	Severe: flooding, wetness.	Moderate: wetness, excess salt.	Severe: wetness.	Moderate: wetness.
Dressler	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness, flooding.	Slight.
Kimmerling	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
541*:				
Softscrabble	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: large stones, small stones.	Severe: slope.
Genoa	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
552: Kimmerling	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.
553, 555: Kimmerling	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
561*:				
Koontz	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
Sutro	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
562*:				
Koontz	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Sutro	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
571*:				
Kram	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Puett Variant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
581*:				
Loomer	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, small stones.
Loomer	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.
582*:				
Loomer	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, small stones.
Olac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
583*:				
Loomer	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope, small stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
583*:				
Zephan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Olac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
591*:				
Minneha	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: slope.
Drit	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
592*:				
Minneha	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Drit	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
601 Mottsville	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.
602 Mottsville	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope, small stones.	Moderate: too sandy.
603 Mottsville	Severe: flooding.	Moderate: slope, large stones, too sandy.	Severe: large stones, slope, small stones.	Moderate: too sandy.
604*:				
Mottsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
604*:				
Roloc	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
611 Nevador	Slight	Slight	Moderate: small stones.	Slight.
612 Nevador	Slight	Slight	Severe: slope.	Slight.
621 Niwot	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.
622 Niwot	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding, percs slowly.	Moderate: wetness.
631*:				
Olac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Ister	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
641, 642 Ophir	Moderate: small stones, wetness.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness.
644 Ophir Variant	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.
651*:				
Oppio	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
661 Ormsby	Severe: flooding.	Moderate: excess salt.	Moderate: small stones, excess salt.	Slight.
662 Ormsby	Severe: flooding.	Moderate: excess salt.	Severe: small stones.	Slight.
671*:				
Pernty	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones.	Moderate: dusty.
671*:				
Burnborough Variant	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Chen	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
672*:				
Pernty	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
673*:				
Pernty	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
681 Phing	Slight	Slight	Severe: slope.	Slight.
682 Phing	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
683 Phing	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
685*:				
Phing	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
691 Updike Variant	Severe: flooding.	Moderate: excess salt, percs slowly.	Moderate: percs slowly, excess salt.	Severe: erodes easily.
693*:				
Updike Variant	Severe: flooding.	Moderate: excess salt, percs slowly.	Moderate: percs slowly, excess salt.	Severe: erodes easily.
Playas.				
702 Perazzo	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
712: Prey	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
713: Prey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
721: Prey Variant	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, small stones, cemented pan.	Slight.
731: Job Variant	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
741*:				
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Chalco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope.	Moderate: large stones.
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight.
742*:				
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Chalco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope.	Severe: slope.
Pula	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
743*:				
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope, small stones.	Moderate: dusty.
Haybourne	Severe: flooding.	Slight	Severe: slope.	Slight.
744*:				
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope, small stones.	Moderate: dusty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
744*:				
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
751*:				
Pula	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Moderate: slope.
Cassiro	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
752*:				
Pula	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Chalco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope.	Severe: slope.
Pung	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
753*:				
Pula	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Pung	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
762*:				
Pulcan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
771 Rawe	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Severe: erodes easily.
772 Rawe	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Severe: erodes easily.
781 Reno	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
782 Reno	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.
783 Reno	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Moderate: large stones.
784 Reno	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
785*:				
Phing Variant	Severe: small stones, percs slowly.	Severe: small stones, percs slowly.	Severe: small stones, percs slowly.	Severe: small stones.
Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
786*:				
Reno	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Moderate: large stones.
Phing	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Springmeyer	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
787*:				
Reno	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Saralegui	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
788*:				
Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Stucky	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
789*:				
Phing Variant	Severe: slope, small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: small stones.
Zephan	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
791 Risue	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones.	Moderate: dusty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
792 Risue	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: slope, small stones.	Moderate: dusty.
801*. Riverwash				
811*. Rock outcrop				
821*:				
Roloc	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
831, 832 Saralegui	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
833*:				
Saralegui	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
833*:				
Saralegui	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
834*:				
Saralegui	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
Haybourne	Severe: flooding.	Slight	Severe: small stones.	Slight.
Reno	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
841*:				
Searles	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Devada	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: large stones.
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
842*:				
Searles	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
842*:				
Duco	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
843*:				
Searles	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Chen	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
851 Settlemeyer	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.
852 Settlemeyer	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Severe: erodes easily.
854 Settlemeyer	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Severe: erodes easily.
861 Shakespeare	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
871 Shree	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight.
872 Shree	Severe: flooding.	Moderate: slope, small stones, percs slowly.	Severe: large stones, slope, small stones.	Moderate: large stones.
873*:				
Shree	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight.
Settlemeyer	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Severe: erodes easily.
874*:				
Shree	Severe: flooding.	Moderate: slope, small stones, percs slowly.	Severe: large stones, slope, small stones.	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
874*: Pung	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Slight.
881 Springmeyer	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
882 Springmeyer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
883 Springmeyer	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
884 Springmeyer	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.
891 Stodick	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, depth to rock.	Slight.
892*: Stodick	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.
892*: Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
901*: Surgem	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
Olac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
911*: Theon	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones,	Severe: small stones.
912*: Theon	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
921 Nevador Variant	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight.
922 Nevador Variant	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
923: Nevador Variant	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
931*, 932*: Temo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
941*, 942*: Toiyabe	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
951: Toll	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
952: Toll	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
953: Toll	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
961*: Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.
962*: Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Pernty	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.
963*: Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Sup	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.
Chen	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
972*:				
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Trid	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
973*:				
Trid	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Drit	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Duco	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
974*:				
Trid	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Roloc	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
975*:				
Trid	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Roloc	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: small stones.	Severe: slope.
976*:				
Trid	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Roloc	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Mottsville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
977*:				
Trid	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Roloc	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Sup	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
982 Turria	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
985 Turria	Severe: flooding.	Slight	Slight	Severe: erodes easily.
986 Turria	Severe: flooding.	Slight	Slight	Slight.
992 Updike	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
993*:				
Updike	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Severe: erodes easily.
Springmeyer	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
994 Updike	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
1011*:				
Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope, small stones.	Moderate: dusty.
Puett	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
1012*:				
Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope, small stones.	Moderate: dusty.
Uhaldi	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Springmeyer	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1021: Veta	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight.
1031*:				
Vicee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
1041: Voltaire	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness, excess salt.	Severe: wetness.
1042, 1044: Voltaire	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
1051: Voltaire Variant	Severe: flooding, wetness, excess salt.	Severe: excess salt.	Severe: wetness, excess salt.	Moderate: wetness.
1061: Washoe	Slight	Slight	Severe: small stones.	Slight.
1062: Washoe	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
1063: Washoe	Moderate: large stones.	Moderate: large stones.	Severe: small stones.	Moderate: large stones.
1066*:				
Washoe	Slight	Slight	Severe: small stones, slope.	Moderate: large stones.
Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
1071: Corbett	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, small stones.	Severe: too sandy.
1072*:				
Corbett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Toiyabe	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
1073*:				
Corbett	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.
Toiyabe	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: too sandy.
1081*:				
Zephan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1081* Zephan	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
1091*: Uhaldi	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Nosrac	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.
1101*: Pung	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Phing	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Chalco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope.	Severe: slope.
1102*: Pung	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Pula	Severe: slope, large stones, small stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
1111 Stucky	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1112*: Stucky	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Stucky	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
101---------------- Aldax	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
102*:					
Aldax-------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Indiano-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
111---------------- Borda	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
121*:					
Borda Variant-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Genoa-------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Burnborough Variant----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
122*:					
Borda Variant-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Borda Variant-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
123*:					
Borda Variant-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chen--------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
124*:					
Borda Variant-----	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, shrink-swell.
Burnborough Variant----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cassiro-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
141---------------- Brockliss	Severe: large stones, cutbanks cave.	Severe: large stones, flooding.	Severe: large stones, flooding.	Severe: large stones, flooding.	Severe: large stones, flooding.
151*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Deven------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Nosrac-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
152*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Duco-------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
153*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Duco-------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rock outcrop.					
154*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Nosrac-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
155*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Nosrac-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Borda------------	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
156*:					
Cagle------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
156*:					
Rock outcrop.					
161*:					
Witefels	Severe: cutbanks cave.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.
Rock outcrop.					
162*, 163*, 164*:					
Witefels	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
165*:					
Witefels	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Temo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
181*:					
Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Chalco	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
182*:					
Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Pula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
183*:					
Chalco	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
191, 192 Cradlebaugh	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
193, 194 Cradlebaugh	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.
201 Dangberg	Moderate: cemented pan, too clayey.	Severe: shrink-swell.	Moderate: cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
202, 203----------- Dangberg	Severe: cutbanks cave, wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.
204, 205----------- Dangberg	Severe: cutbanks cave, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.
211*:					
Devada------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Drit--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc-------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
212*:					
Devada------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Koontz------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
213*:					
Devada------------	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength.
Burnborough Variant----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
214*:					
Devada------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Rock outcrop.					
221---------------- East Fork Variant	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
231*:					
Brockliss Variant	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
Brockliss Variant	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
Dangberg----------	Moderate: cemented pan, too clayey.	Severe: shrink-swell.	Moderate: cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
241---------------- Dressler	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.
242---------------- Dressler	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.
251*:					
Duco--------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Cagle-------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Nosrac------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
252*:					
Duco--------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Devada------------	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength.
Nosrac------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
253*:					
Duco--------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Nosrac------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
254*:					
Duco--------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Nosrac------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Burnborough Variant----------	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
255*:					
Duco--------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Searles-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
261*: Dumps.					

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
261*: Pits.					
271, 272 East Fork	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.
281, 282 Fettic	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
292*: Vicee Variant	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Rock outcrop.					
301*: Franktown	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Rubble land.					
Rock outcrop.					
311, 312, 313, 314, 315 Gardnerville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
321*: Genoa	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
322*: Genoa	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
331*: Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Genoa	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
Glean	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
332*:					
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Genoa	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
Rubble land.					
334*:					
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sup	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Genoa	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
341*:					
Glenbrook	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Glenbrook	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
342*:					
Glenbrook	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
351 Godecke	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
362*:					
Gralic	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gralic	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.
Rock outcrop.					
363*:					
Gralic	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
371, 372 Graylock	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
381 Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
382 Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.
391, 392, 393, 394 Haybourne	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
401 Heidtman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
402 Heidtman	Moderate: too clayey, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
411 Henningsen	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
412 Henningsen	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
413 Henningsen	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
414 Henningsen	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
422 Henningsen Variant	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.
431* Shalcar family	Severe: cutbanks cave, excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.
442 Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
443 Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
444*:					
Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
Glenbrook	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
445*:					
Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
445*:					
Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.
Reno	Severe: cutbanks cave.	Severe: shrink-swell.	Moderate: cemented pan, slope.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
446*:					
Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
451*:					
Hyloc	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Ister	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
461 Hussman	Moderate: too clayey, wetness, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, frost action.
462, 463 Hussman	Moderate: too clayey, wetness.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, frost action, shrink-swell.
471 Incy	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
481 Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
482 Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.
483 Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
485*:					
Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
Haybourne	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
486*:					
Indian Creek-----	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
Reno-------------	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Cassiro----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
487*:					
Indian Creek Variant---------	Severe: cemented pan, cutbanks cave, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.
Cassiro----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Puett------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
488*:					
Indian Creek Variant---------	Severe: cemented pan, cutbanks cave, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.
Roloc------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
491--------------- Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
501--------------- James Canyon	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: frost action.
502--------------- James Canyon	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action.
503--------------- Kimmerling Variant	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, frost action.
511--------------- James Canyon Variant	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.
512--------------- James Canyon Variant	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell, slope.	Severe: frost action.
521--------------- Job	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
523---------------- Job	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.
524---------------- Job	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness, shrink-swell.	Severe: flooding.	Severe: flooding, frost action.
531---------------- Jubilee	Severe: wetness, cutbanks cave.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, frost action.
532---------------- Jubilee	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.
533---------------- Jubilee Variant	Severe: cutbanks cave, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding, frost action.
534*:					
Jubilee-----------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.
Dressler----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.
Kimmerling--------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.
541*:					
Softscrabble------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Genoa-------------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
552---------------- Kimmerling	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
553---------------- Kimmerling	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.
555---------------- Kimmerling	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.
561*, 562*:					
Koontz------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
561*, 562*:					
Sutro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
571*:					
Kram	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Puett Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
581*:					
Loomer	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Loomer	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
582*:					
Loomer	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Olac	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
583*:					
Loomer	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Zephan	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Olac	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
591*:					
Minneha	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
592*:					
Minneha	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
592*:					
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
601 Mottsville	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
602 Mottsville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
603 Mottsville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.
604*:					
Mottsville	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
611 Nevador	Slight	Slight	Slight	Slight	Moderate: frost action.
612 Nevador	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.
621, 622 Niwot	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.
631*:					
Olac	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Ister	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
641 Ophir	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.
642 Ophir	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.
644 Ophir Variant	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, frost action.
651*:					
Oppio	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
651*:					
Nosrac-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
661, 662---------- Ormsby	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
671*:					
Pernty-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
Burnborough Variant---------	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
Chen-------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
672*:					
Pernty-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
673*:					
Pernty-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
681--------------- Phing	Moderate: too clayey.	Severe: shrink-swell.	Moderate: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
682--------------- Phing	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
683--------------- Phing	Moderate: too clayey.	Severe: shrink-swell.	Moderate: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
685*:					
Phing------------	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Chalco-----------	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Uhaldi-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
691---------------- Updike Variant	Slight------------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
693*: Updike Variant---	Slight------------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
Playas.					
702---------------- Perazzo	Severe: cutbanks cave.	Slight------------	Slight------------	Moderate: slope.	Slight.
712---------------- Prey	Severe: cutbanks cave.	Slight------------	Moderate: cemented pan.	Slight------------	Moderate: frost action.
713---------------- Prey	Severe: cutbanks cave.	Moderate: slope.	Moderate: cemented pan, slope.	Severe: slope.	Moderate: slope, frost action.
721---------------- Prey Variant	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Moderate: cemented pan, slope, frost action.
731---------------- Job Variant	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.
741*: Puett------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Chalco-----------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Chalco-----------	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
742*: Puett------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Chalco-----------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Pula-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
743*: Puett------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Verdico----------	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Haybourne--------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
744*:					
Puett	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
751*:					
Pula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cassiro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
752*:					
Pula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Pung	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
753*:					
Pula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pung	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
762*:					
Pulcan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Puett	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
771 Rawe	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
772 Rawe	Slight	Slight	Slight	Slight	Slight.
781 Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
782------------- Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
783------------- Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
784------------- Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
785*:					
Phing Variant----	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Reno-------------	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
786*:					
Reno-------------	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Phing------------	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Springmeyer------	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
787*:					
Reno-------------	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Saralegui--------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
788*:					
Reno-------------	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: cemented pan.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Stucky-----------	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
789*:					
Phing Variant----	Severe: cemented pan, slope.	Severe: shrink-swell, slope.	Severe: cemented pan, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Zephan-----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
791------------- Risue	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
792 Risue	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, slope, cemented pan.	Severe: cemented pan, low strength, shrink-swell.
801*. Riverwash					
811*. Rock outcrop					
821*:					
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
831, 832 Saralegui	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
833*:					
Saralegui	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
834*:					
Saralegui	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
Haybourne	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
841*:					
Searles	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Devada	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Duco	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
842*:					
Searles	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Duco	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
843*:					
Searles	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chen	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
851 Settlemeyer	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.
852 Settlemeyer	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
854 Settlemeyer	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
861 Shakespeare	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
871 Shree	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
872 Shree	Moderate: slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
873*:					
Shree	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
Settlemeyer	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.
874*:					
Shree	Moderate: slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
Pung	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
881 Springmeyer	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
882, 883: Springmeyer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
884: Springmeyer	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
891: Stodick	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.
892*:					
Stodick	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
901*:					
Surgem	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Olac	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Cagle	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
911*:					
Theon	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
912*:					
Theon	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
921: Nevador Variant	Severe: cemented pan.	Moderate: shrink-swell, cemented pan.	Severe: cemented pan.	Moderate: shrink-swell, cemented pan.	Moderate: cemented pan, frost action.
922: Nevador Variant	Severe: cemented pan.	Moderate: shrink-swell, slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Moderate: cemented pan, slope, frost action.
923: Nevador Variant	Severe: cemented pan.	Moderate: shrink-swell, cemented pan.	Severe: cemented pan.	Moderate: shrink-swell, slope, cemented pan.	Moderate: cemented pan, frost action.
931*, 932*:					
Temo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
941*, 942*:					
Toiyabe	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
951 Toll	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
952 Toll	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
953 Toll	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
961*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
962*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pernty	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
963*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sup	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chen	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
972*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Trid	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: depth to rock, slope, frost action, shrink-swell.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
973*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope
Duco	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
974*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Drit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
975*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Glean	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
976*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Mottsville	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
977*:					
Trid	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roloc	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Sup	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
982 Turria	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
985 Turria	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
986 Turria	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
992 Updike	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
993*:					
Updike	Moderate: too clayey, wetness, flooding.	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.
Springmeyer	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
994 Updike	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.
1011*:					
Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Puett	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
1012*:					
Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Springmeyer	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
1021 Veta	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
1031*:					
Vicee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1041 Voltaire	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.
1042, 1044 Voltaire	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.
1051 Voltaire Variant	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.
1061 Washoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
1062 Washoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1063 Washoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
1066*: Washoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
Reno	Severe: cutbanks cave, cemented pan.	Severe: shrink-swell.	Moderate: cemented pan, slope.	Severe: cemented pan.	Severe: low strength, shrink-swell.
1071 Corbett	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1072*: Corbett	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Toiyabe	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
1073*: Corbett	Severe: cutbanks cave.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight.
Toiyabe	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
1081*: Zephan	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Zephan	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
1091*: Uhaldi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1101*: Pung	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Phing	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1102*:					
Pung	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Pula	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Uhaldi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1111 Stucky	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.
1112*:					
Stucky	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.
Stucky	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
101------------------ Aldax	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
102*:					
Aldax---------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Indiano-------------	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
111------------------ Borda	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: hard to pack.
121*:					
Borda Variant-------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
Genoa---------------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Burnborough Variant	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
122*:					
Borda Variant-------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
123*:					
Borda Variant-------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Chen----------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
124*:					
Borda Variant	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, small stones.
Burnborough Variant	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Cassiro	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
141 Brockliss	Severe: flooding, poor filter, large stones.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: seepage, flooding.	Poor: seepage, large stones, too sandy.
151*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Deven	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
152*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
153*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
154*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
155*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Borda	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: hard to pack.
156*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Rock outcrop.					
161*:					
Witefels	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, too sandy.
Rock outcrop.					
162*, 163*, 164*:					
Witefels	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Rock outcrop.					
165*:					
Witefels	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Temo	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
181*:					
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Chalco	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
182*:					
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
182*:					
Pula	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
183*:					
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
191, 192 Cradlebaugh	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: too clayey, wetness.
193, 194 Cradlebaugh	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: excess sodium.
201 Dangberg	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: excess salt.	Severe: cemented pan.	Poor: area reclaim.
202, 203 Dangberg	Severe: cemented pan, wetness, percs slowly.	Severe: seepage, cemented pan, flooding.	Severe: wetness, too sandy, excess salt.	Severe: cemented pan, wetness.	Poor: area reclaim, seepage, too sandy.
204, 205 Dangberg	Severe: flooding, cemented pan, wetness.	Severe: seepage, cemented pan, flooding.	Severe: flooding, wetness, too sandy.	Severe: flooding, cemented pan, wetness.	Poor: area reclaim, seepage, wetness.
211*:					
Devada	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Drit	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
212*:					
Devada	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Koontz	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
213*:					
Devada	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Burnborough Variant	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
214*:					
Devada	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
221 East Fork Variant	Moderate: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage.	Fair: small stones, thin layer.
231*:					
Brockliss Variant	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding.	Poor: small stones.
Brockliss Variant	Severe: wetness.	Severe: flooding.	Severe: wetness.	Moderate: flooding, wetness.	Poor: small stones.
Dangberg	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: excess salt.	Severe: cemented pan.	Poor: area reclaim.
241, 242 Dressler	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
251*:					
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
252*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Devada	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
252*:					
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
253*:					
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
254*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Burnborough Variant	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
255*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Searles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
261*:					
Dumps.					
Pits.					
271, 272 East Fork	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding, wetness.	Fair: too clayey, thin layer.
281, 282 Fettic	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: too sandy, excess sodium.
292*:					
Vicee Variant	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
301*:					
Franktown	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
301*:					
Rubble land.					
Rock outcrop.					
311----------------- Gardnerville	Severe: poor filter.	Severe: seepage, flooding.	Severe: wetness, too sandy.	Moderate: flooding, wetness.	Poor: too sandy.
312----------------- Gardnerville	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
313, 314, 315------- Gardnerville	Severe: poor filter.	Severe: seepage, flooding.	Severe: wetness, too sandy.	Moderate: flooding, wetness.	Poor: too sandy.
321*:					
Genoa---------------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
322*:					
Genoa---------------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Rock outcrop.					
331*:					
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Genoa---------------	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, large stones.
Glean---------------	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
332*:					
Glean---------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope. .	Severe: seepage, slope.	Poor: small stones, slope.
Genoa---------------	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, large stones.
Rubble land.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
334*:					
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Sup	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
Genoa	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
341*:					
Glenbrook	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, too sandy.	Severe: depth to rock.	Poor: area reclaim, seepage, too sandy.
Glenbrook	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, too sandy.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, too sandy.
342*:					
Glenbrook	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, too sandy.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
351 Godecke	Severe: wetness, poor filter.	Severe: seepage, flooding.	Severe: wetness.	Moderate: flooding, wetness.	Good.
362*:					
Gralic	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Gralic	Moderate: slope, large stones.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
363*:					
Gralic	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Rock outcrop.					
371, 372 Graylock	Severe: poor filter, slope, large stones.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
381, 382 Greenbrae	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too sandy.	Slight	Poor: too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
391, 392, 393, 394-- Haybourne	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
401----------------- Heidtman	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness, thin layer.
402----------------- Heidtman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Fair: too clayey, thin layer.
411, 412, 413, 414-- Henningsen	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
422----------------- Henningsen Variant	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, small stones.
431*---------------- Shalcar family	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
442----------------- Holbrook	Moderate: flooding, large stones.	Severe: seepage, flooding.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, small stones.
443----------------- Holbrook	Moderate: flooding, slope, large stones.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, small stones.
444*:					
Holbrook-----------	Moderate: flooding, slope, large stones.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, small stones.
Glenbrook----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, too sandy.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, too sandy.
445*:					
Holbrook-----------	Moderate: flooding, slope, large stones.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, small stones.
Greenbrae----------	Severe: percs slowly.	Severe: slope.	Severe: too sandy.	Moderate: slope.	Poor: too sandy.
Reno---------------	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Moderate: cemented pan, slope, too sandy.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
446*:					
Holbrook-----------	Moderate: flooding, slope, large stones.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
446*:					
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
451*:					
Hyloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Ister	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, large stones, slope.
461 Hussman	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.
462 Hussman	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey, excess sodium.	Severe: wetness.	Poor: too clayey, hard to pack, excess sodium.
463 Hussman	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
471 Incy	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: slope, too sandy.	Severe: slope.	Poor: seepage, too sandy, slope.
481 Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
482 Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
483 Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
485*:					
Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
Haybourne	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
486*:					
Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
486*:					
Reno	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
Cassiro	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
487*:					
Indian Creek Variant	Severe: cemented pan, poor filter, slope.	Severe: seepage, cemented pan, slope.	Severe: cemented pan, seepage, slope.	Severe: cemented pan, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Cassiro	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
488*:					
Indian Creek Variant	Severe: cemented pan, poor filter, slope.	Severe: seepage, cemented pan, slope.	Severe: cemented pan, seepage, slope.	Severe: cemented pan, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
491 Indiano	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
501, 502 James Canyon	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, small stones.
503 Kimmerling Variant	Severe: wetness.	Severe: flooding, excess humus.	Severe: wetness.	Severe: wetness.	Poor: wetness.
511 James Canyon Variant	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, excess salt.	Severe: seepage, wetness.	Poor: excess salt.
512 James Canyon Variant	Severe: Wetness, poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: excess salt.
521, 523 Job	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
524 Job	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.
531 Jubilee	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
532 Jubilee	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.
533 Jubilee Variant	Severe: flooding, wetness.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus.
534*:					
Jubilee	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.
Dressler	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
Kimmerling	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
541*:					
Softscrabble	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Genoa	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
552 Kimmerling	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: small stones, wetness.
553, 555 Kimmerling	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
561*, 562*:					
Koontz	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
592*:					
Drit	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Rock outcrop.					
601 Mottsville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
602 Mottsville	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
603 Mottsville	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
604*:					
Mottsville	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Drit	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
611 Nevador	Slight	Severe: seepage.	Slight	Slight	Good.
612 Nevador	Slight	Severe: seepage.	Moderate: too sandy.	Slight	Fair: small stones.
621 Niwot	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
622 Niwot	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
631*:					
Olac	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Ister	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
641, 642: Ophir	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
644: Ophir Variant	Severe: wetness.	Severe: seepage, flooding.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
651*:					
Oppio	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
661, 662: Ormsby	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
671*:					
Pernty	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Burnborough Variant	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Chen	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
672*:					
Pernty	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
673*:					
Pernty	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
561*, 562*:					
Sutro	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
571*:					
Kram	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Puett Variant	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
581*:					
Loomer	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
582*:					
Loomer	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Olac	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
583*:					
Loomer	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Olac	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
591*:					
Minneha	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Drit	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
592*:					
Minneha	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
681----------------- Phing	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
682----------------- Phing	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
683----------------- Phing	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
685*:					
Phing---------------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Chalco--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Uhaldi--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
691----------------- Updike Variant	Severe: percs slowly.	Severe: flooding.	Severe: excess salt.	Moderate: flooding.	Poor: excess salt.
693*:					
Updike Variant-----	Severe: percs slowly.	Severe: flooding.	Severe: excess salt.	Moderate: flooding.	Poor: excess salt.
Playas.					
702----------------- Perazzo	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
712----------------- Prey	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan.	Moderate: cemented pan, too sandy.	Severe: cemented pan.	Poor: area reclaim.
713----------------- Prey	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Moderate: cemented pan, slope, too sandy.	Severe: cemented pan.	Poor: area reclaim, small stones.
721----------------- Prey Variant	Severe: cemented pan.	Severe: cemented pan, slope.	Moderate: cemented pan, slope.	Severe: cemented pan.	Poor: area reclaim, small stones.
731----------------- Job Variant	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, excess salt.	Severe: flooding, wetness.	Poor: excess salt.
741*:					
Puett---------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Chalco--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
741*:					
Chalco	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
742*:					
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Pula	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
743*:					
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Haybourne	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
744*:					
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Uhaldi	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
751*:					
Pula	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Cassiro	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
752*:					
Pula	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
752*:					
Pung	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
753*:					
Pula	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pung	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
762*:					
Pulcan	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Uhaldi	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
771 Rawe	Moderate: slope.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: seepage, small stones.
772 Rawe	Slight	Severe: seepage.	Slight	Slight	Poor: seepage, small stones.
781 Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
782 Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
783 Reno	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
784 Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
785*:					
Phing Variant	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
785*:					
Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
786*:					
Reno	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
Phing	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Springmeyer	Severe: percs slowly.	Severe: slope.	Moderate: slope, too sandy.	Moderate: slope.	Fair: too sandy, small stones, slope.
787*:					
Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
Saralegui	Severe: poor filter.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: thin layer.
788*:					
Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
Stucky	Severe: percs slowly, large stones.	Severe: slope, large stones.	Severe: large stones.	Slight	Poor: small stones.
789*:					
Phing Variant	Severe: cemented pan, percs slowly, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope, too clayey.	Severe: cemented pan, slope.	Poor: area reclaim, too clayey, hard to pack.
Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
791 Risue	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
792 Risue	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
801*. Riverwash					
811*. Rock outcrop					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
821*:					
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Drit	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
831, 832 Saralegui	Severe: poor filter.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: thin layer.
833*:					
Saralegui	Severe: poor filter.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: thin layer.
Saralegui	Severe: poor filter.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: thin layer.
834*:					
Saralegui	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: thin layer.
Haybourne	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
Reno	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
841*:					
Searles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Deven	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
842*:					
Searles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Duco	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
843*:					
Searles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Chen	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
851 Settlemeyer	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
852 Settlemeyer	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, small stones.
854 Settlemeyer	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, small stones.
861 Shakespeare	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: wetness, slope.	Poor: slope.
871 Shree	Severe: percs slowly.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: small stones.
872 Shree	Severe: percs slowly.	Severe: seepage, flooding, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
873*:					
Shree	Severe: percs slowly.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: small stones.
Settlemeyer	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, too sandy, small stones.
874*:					
Shree	Severe: percs slowly.	Severe: seepage, flooding, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
Pung	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
881 Springmeyer	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too sandy, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
882, 883------------ Springmeyer	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
884----------------- Springmeyer	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Fair: too sandy, small stones.
891----------------- Stodick	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
892*: Stodick------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
892*: Indiano------------	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
901*: Surgem-------------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Olac---------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Cagle--------------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
911*: Theon--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
912*: Theon--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
921----------------- Nevador Variant	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
922----------------- Nevador Variant	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
923----------------- Nevador Variant	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
931*, 932*: Temo---------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
941*, 942*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
951 Toll	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Fair: too sandy, thin layer.
952 Toll	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope, too sandy.	Moderate: slope.	Fair: too sandy, slope, thin layer.
953 Toll	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Poor: thin layer.
961*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
962*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pernty	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
963*:					
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Sup	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
Chen	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
972*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Trid	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
972*:					
Drit	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
973*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Drit	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Duco	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, small stones.
974*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Drit	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
975*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Glean	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
976*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Mottsville	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
977*:					
Trid	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Roloc	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Sup	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
982 Turria	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
985 Turria	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding, wetness.	Good.
986 Turria	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
992 Updike	Severe: percs slowly.	Severe: seepage, flooding.	Severe: wetness, excess salt.	Moderate: flooding.	Poor: hard to pack.
993*:					
Updike	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Springmeyer	Severe: percs slowly.	Severe: flooding.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
994 Updike	Severe: percs slowly.	Severe: seepage, flooding.	Severe: wetness, excess salt.	Moderate: flooding.	Poor: hard to pack.
1011*:					
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Puett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
1012*:					
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Uhaldi	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Springmeyer	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too sandy, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1021 Veta	Moderate: flooding, large stones.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
1031*: Vicee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
1041 Voltaire	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, excess salt.	Severe: flooding, wetness.	Poor: wetness.
1042, 1044 Voltaire	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, too sandy, wetness.
1051 Voltaire Variant	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness.	Poor: wetness, excess salt.
1061 Washoe	Severe: percs slowly.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
1062 Washoe	Severe: percs slowly.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
1063 Washoe	Severe: percs slowly.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
1066*: Washoe	Severe: percs slowly.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
Reno	Severe: cemented pan, poor filter.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
1071 Corbett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
1072*: Corbett	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Toiyabe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
1073*: Corbett	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
Toiyabe	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1081*:					
Zephan-------------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Zephan-------------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack, large stones.
1091*:					
Uhaldi-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Nosrac-------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
1101*:					
Pung---------------	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Phing--------------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Chalco-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
1102*:					
Pung---------------	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
Pula---------------	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Uhaldi-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1111--------------- Stucky	Severe: percs slowly, large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.
1112*:					
Stucky-------------	Severe: percs slowly, large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.
Stucky-------------	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
101 Aldax	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
102*:				
Aldax	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
111 Borda	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
121*:				
Borda Variant	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Genoa	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
Burnborough Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
122*:				
Borda Variant	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Borda Variant	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
123*:				
Borda Variant	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
123*:				
Chen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
124*:				
Borda Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Burnborough Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Cassiro	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
141 Brockliss	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
151*:				
Cagle	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Deven	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
152*:				
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duco	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
153*:				
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duco	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
154*:				
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
154*:				
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
155*:				
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Borda	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
156*:				
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
161*:				
Witefels	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Rock outcrop.				
162*:				
Witefels	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
163*, 164*:				
Witefels	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
165*:				
Witefels	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Temo	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
181*:				
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
182*:				
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pula	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
183*:				
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
191, 192 Cradlebaugh	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
193, 194 Cradlebaugh	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
201 Dangberg	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
202, 203, 204, 205 Dangberg	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too clayey, excess salt.
211*:				
Devada	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
212*:				
Devada	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
212*: Koontz	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
213*: Devada	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Burnborough Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
214*: Devada	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
221 East Fork Variant	Good	Probable	Probable	Poor: small stones, area reclaim.
231*: Brockliss Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Dangberg	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
241 Dressler	Good	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
242 Dressler	Fair: wetness.	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
251*: Duco	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Cagle	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
252*: Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Devada	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
252*:				
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
253*:				
Duco	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
254*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Burnborough Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
255*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Searles	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
261*:				
Dumps.				
Pits.				
271 East Fork	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
272 East Fork	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
281 Fettic	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
282 Fettic	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt, excess sodium.
292*:				
Vicee Variant	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
292*: Rock outcrop.				
301*: Franktown	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rubble land.				
Rock outcrop.				
311 Gardnerville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
312 Gardnerville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
313 Gardnerville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
314 Gardnerville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
315 Gardnerville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium.
321*: Genoa	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
322*: Genoa	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
331*: Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Genoa	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones.
Glean	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
332*:				
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Genoa	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones.
Rubble land.				
334*:				
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Sup	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Genoa	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
341*:				
Glenbrook	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, small stones.
342*:				
Glenbrook	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, small stones.
Rock outcrop.				
351 Godecke	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
362*:				
Gralic	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Gralic	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
363*:				
Gralic	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
371, 372 Graylock	Poor: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
381, 382 Greenbrae	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
391 Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
392, 393 Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
394 Haybourne	Good	Probable	Probable	Poor: small stones, area reclaim.
401 Heidtman	Good	Probable	Probable	Fair: too clayey, small stones, area reclaim.
402 Heidtman	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
411 Henningsen	Good	Probable	Probable	Poor: small stones, area reclaim.
412 Henningsen	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
413 Henningsen	Good	Probable	Probable	Poor: small stones, area reclaim.
414 Henningsen	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
422 Henningsen Variant	Good	Probable	Probable	Poor: small stones, area reclaim.
431* Shalcar family	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
442, 443 Holbrook	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
444*:				
Holbrook	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Glenbrook	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, small stones.
445*:				
Holbrook	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
445*:				
Greenbrae	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
446*:				
Holbrook	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
451*:				
Hyloc	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Ister	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
461 Hussman	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
462 Hussman	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
463 Hussman	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
471 Incy	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
481, 482, 483 Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
485*:				
Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
486*:				
Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Reno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cassiro	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
487*: Indian Creek Variant	Poor: area reclaim, slope.	Probable	Probable	Poor: area reclaim, small stones, slope.
Cassiro	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Puett	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
488*: Indian Creek Variant	Poor: area reclaim, slope.	Probable	Probable	Poor: area reclaim, small stones, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
491 Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
501, 502 James Canyon	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
503 Kimmerling Variant	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
511 James Canyon Variant	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
512 James Canyon Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
521, 523 Job	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: excess salt.
524 Job	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: excess salt.
531 Jubilee	Poor: wetness, frost action.	Probable	Improbable: too sandy.	Poor: wetness.
532 Jubilee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
533 Jubilee Variant	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
534*: Jubilee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, excess salt.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
534*:				
Dressler	Fair: wetness.	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
Kimmerling	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
541*:				
Softscrabble	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Genoa	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
552 Kimmerling	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, wetness.
553 Kimmerling	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
555 Kimmerling	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
561*:				
Koontz	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Sutro	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
562*:				
Koontz	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Sutro	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
571*:				
Kram	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
571*: Puett Variant	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
581*: Loomer	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Loomer	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
582*: Loomer	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Olac	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
583*: Loomer	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Zephan	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Olac	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
591*: Minneha	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
592*: Minneha	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
592*:				
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
601, 602 Mottsville	Good	Probable	Improbable: too sandy.	Poor: small stones.
603 Mottsville	Good	Probable	Probable	Poor: small stones, area reclaim.
604*:				
Mottsville	Poor: slope.	Probable	Improbable: too sandy.	Poor: small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
611, 612 Nevador	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
621 Niwot	Fair: wetness.	Probable	Improbable: too sandy.	Poor: small stones.
622 Niwot	Poor: thin layer.	Improbable: thin layer.	Improbable: too sandy.	Poor: small stones.
631*:				
Olac	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Ister	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
641, 642 Ophir	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
644 Ophir Variant	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, small stones, wetness.
651*:				
Oppio	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
661, 662: Ormsby	Good	Probable	Improbable: too sandy.	Poor: small stones.
671*:				
Pernty	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Burnborough Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Chen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
672*:				
Pernty	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
673*:				
Pernty	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
681, 682, 683: Phing	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
685*:				
Phing	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Uhaldi	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
691: Updike Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
693*:				
Updike Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Playas.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
702: Perazzo	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
712: Prey	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
713: Prey	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
721: Prey Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
731: Job Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
741*:				
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
742*:				
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Chalco	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pula	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
743*:				
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
744*:				
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
744*:				
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Uhaldi	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
751*:				
Pula	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Cassiro	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
752*:				
Pula	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Chalco	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pung	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
753*:				
Pula	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pung	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
762*:				
Pulcan	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Uhaldi	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
771, 772 Rawe	Good	Probable	Probable	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
781, 782: Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
783: Reno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
784: Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
785*:				
Phing Variant	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
786*:				
Reno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Phing	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
787*:				
Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
Saralegui	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
788*:				
Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
Stucky	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
789*:				
Phing Variant	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Zephan	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
791, 792: Risue	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
801*. Riverwash				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
811*. Rock outcrop				
821*:				
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
831, 832 Saralegui	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
833*:				
Saralegui	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
Saralegui	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
834*:				
Saralegui	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Reno	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
841*:				
Searles	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Devada	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Duco	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
842*:				
Searles	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Duco	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
843*:				
Searles	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Chen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
851 Settlemeyer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
852 Settlemeyer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
854 Settlemeyer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
861 Shakespeare	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
871, 872 Shree	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
873*:				
Shree	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Settlemeyer	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
874*:				
Shree	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Pung	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
881 Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
882, 883 Springmeyer	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
884 Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
891 Stodick	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
892*: Stodick	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
901*: Surgem	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
Olac	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Cagle	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
911*: Theon	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
912*: Theon	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
921, 922, 923 Nevador Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
931*, 932*: Temo	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
Rock outcrop.				
941*, 942*: Toiyabe	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
Rock outcrop.				
951 Toll	Good	Probable	Improbable: too sandy.	Fair: too sandy.
952 Toll	Good	Probable	Improbable: too sandy.	Fair: too sandy, slope.
953 Toll	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
961*:				
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
962*:				
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pernty	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
963*:				
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Sup	Fair: large stones, slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Chen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
972*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Trid	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
973*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
973*:				
Duco	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
974*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Drit	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
975*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Glean	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
976*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Mottsville	Poor: slope.	Probable	Improbable: too sandy.	Poor: small stones, slope.
977*:				
Trid	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Roloc	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Sup	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
982 Turria	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
985, 986: Turria	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
992: Updike	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
993*:				
Updike	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Springmeyer	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
994: Updike	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
1011*:				
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Puett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1012*:				
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Uhaldi	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1021: Veta	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1031*:				
Vicee	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
1041: Voltaire	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
1042, 1044: Voltaire	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
1051: Voltaire Variant	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1061, 1062, 1063 Washoe	Good	Probable	Probable	Poor: small stones, area reclaim.
1066*:				
Washoe	Good	Probable	Probable	Poor: small stones, area reclaim.
Reno	Good	Probable	Probable	Poor: small stones, area reclaim.
1071 Corbett	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
1072*:				
Corbett	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Toiyabe	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
1073*:				
Corbett	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Toiyabe	Poor: area reclaim.	Unsuited: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
1081*:				
Zephan	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Zephan	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1091*:				
Uhaldi	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
1101*:				
Pung	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Phing	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Chalco	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1102*:				
Pung	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Pula	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Uhaldi	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1111 Stucky	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
1112*:				
Stucky	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
Stucky	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
101: Aldax	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
102*:					
Aldax	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
111: Borda	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
121*:					
Borda Variant	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, percs slowly, slope.	Slope, large stones, percs slowly.
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Burnborough Variant	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
122*:					
Borda Variant	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, percs slowly, slope.	Slope, large stones, percs slowly.
Borda Variant	Severe: slope.	Slight	Deep to water	Droughty, percs slowly, slope.	Slope, percs slowly.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
123*:					
Borda Variant	Severe: slope.	Slight	Deep to water	Droughty, percs slowly, slope.	Slope, percs slowly.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.
Chen	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly.	Slope, large stones, depth to rock.
124*:					
Borda Variant	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, percs slowly, slope.	Slope, large stones, percs slowly.
Burnborough Variant	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
124*:					
Cassiro----------	Severe: slope.	Moderate: large stones.	Deep to water----	Droughty, slope.	Slope, large stones.
141--------------- Brockliss	Severe: seepage.	Severe: seepage, large stones.	Deep to water----	Large stones, droughty, fast intake.	Large stones, too sandy.
151*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Deven------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Nosrac-----------	Severe: slope.	Moderate: large stones.	Deep to water----	Large stones, slope.	Slope, large stones.
152*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Duco-------------	Severe: depth to rock, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
153*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Duco-------------	Severe: depth to rock, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
154*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Nosrac-----------	Severe: slope.	Moderate: large stones.	Deep to water----	Slope------------	Slope, large stones.
155*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Nosrac-----------	Severe: slope.	Moderate: large stones.	Deep to water----	Large stones, slope.	Slope, large stones.
Borda------------	Severe: slope.	Severe: hard to pack.	Deep to water----	Percs slowly, slope.	Slope, percs slowly.
156*:					
Cagle------------	Severe: slope.	Moderate: thin layer, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Burnborough------	Severe: slope.	Moderate: large stones.	Deep to water----	Droughty, slope.	Slope, large stones.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
156*: Rock outcrop.					
161*: Witefels	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, depth to rock, too sandy.
Rock outcrop.					
162*, 163*, 164*: Witefels	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, depth to rock, too sandy.
Rock outcrop.					
165*: Witefels	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, depth to rock, too sandy.
Temo	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, depth to rock.
181*: Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
182*: Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
183*: Chalco	Severe: depth to rock.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
191, 192 Cradlebaugh	Severe: seepage.	Severe: excess salt.	Deep to water	Flooding, excess salt.	Favorable.
193, 194 Cradlebaugh	Severe: seepage.	Severe: excess sodium, excess salt.	Flooding, frost action, excess salt.	Wetness, flooding, excess sodium.	Wetness.
201 Dangberg	Severe: seepage.	Severe: piping, excess salt.	Deep to water	Percs slowly, cemented pan, erodes easily.	Cemented pan, erodes easily.
202, 203 Dangberg	Moderate: seepage, cemented pan.	Severe: seepage, excess salt.	Percs slowly, cemented pan, cutbanks cave.	Wetness, slow intake, percs slowly.	Cemented pan, wetness, too sandy.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
204, 205 Dangberg	Moderate: seepage, cemented pan.	Severe: seepage, wetness, excess salt.	Percs slowly, cemented pan, flooding.	Wetness, slow intake, percs slowly.	Cemented pan, wetness, too sandy.
211*:					
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
212*:					
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Koontz	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
213*:					
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Burnborough Variant	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
214*:					
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Rock outcrop.					
221 East Fork Variant	Severe: seepage.	Moderate: thin layer.	Deep to water	Favorable	Favorable.
231*:					
Brockliss Variant	Moderate: seepage, slope.	Slight	Deep to water	Droughty, slope.	Favorable.
Brockliss Variant	Moderate: seepage, slope.	Moderate: wetness.	Deep to water	Droughty, slope.	Favorable.
Dangberg	Severe: seepage.	Severe: piping, excess salt.	Deep to water	Percs slowly, cemented pan, erodes easily.	Cemented pan, erodes easily.
241 Dressler	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, flooding.	Large stones, too sandy.
242 Dressler	Severe: seepage.	Severe: seepage.	Flooding, large stones, frost action.	Wetness, droughty.	Large stones, wetness, too sandy.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
251*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Cagle	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
252*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Slope	Slope, large stones.
253*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
254*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
Burnborough Variant	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
255*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Searles	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
261*:					
Dumps.					
Pits.					
271, 272 East Fork	Slight	Moderate: wetness.	Deep to water	Favorable	Favorable.
281 Fettic	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Percs slowly, flooding.	Too sandy, soil blowing.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
282: Fettic	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Slow intake, percs slowly, flooding.	Too sandy.
292*:					
Vicee Variant	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
301*:					
Franktown	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Rubble land.					
Rock outcrop.					
311: Gardnerville	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Too sandy.
312: Gardnerville	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, percs slowly, excess salt.	Too sandy.
313: Gardnerville	Severe: seepage.	Severe: seepage, piping, excess sodium.	Deep to water	Droughty, percs slowly.	Too sandy.
314: Gardnerville	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slow intake, percs slowly.	Too sandy.
315: Gardnerville	Severe: seepage.	Severe: seepage, piping, excess sodium.	Deep to water	Droughty, slow intake, percs slowly.	Too sandy.
321*:					
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
322*:					
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Rock outcrop.					
331*:					
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
331*:					
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.
332*:					
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rubble land.					
334*:					
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Sup	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Genoa	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
341*:					
Glenbrook	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock.
342*:					
Glenbrook	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock.
Rock outcrop.					
351 Godecke	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Percs slowly, erodes easily, excess sodium.	Erodes easily, too sandy.
362*:					
Gralic	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
363*:					
Gralic	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Rock outcrop.					
371, 372 Graylock	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, too sandy.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
381 Greenbrae	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Too sandy.
382 Greenbrae	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Too sandy.
391 Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy.
392 Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Erodes easily, too sandy.
393 Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Erodes easily, too sandy.
394 Haybourne	Severe: seepage.	Moderate: thin layer, seepage.	Deep to water	Droughty	Too sandy.
401 Heidtman	Moderate: seepage.	Moderate: thin layer, wetness.	Deep to water	Flooding, excess salt.	Favorable.
402 Heidtman	Slight	Moderate: thin layer.	Deep to water	Percs slowly, flooding.	Favorable.
411 Henningsen	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, erodes easily.	Erodes easily, too sandy.
412 Henningsen	Severe: seepage.	Severe: seepage.	Flooding, cutbanks cave.	Wetness, droughty.	Erodes easily, wetness, too sandy.
413 Henningsen	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Too sandy.
414 Henningsen	Severe: seepage.	Severe: seepage.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.
422 Henningsen Variant	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, flooding.	Too sandy.
431* Shalcar family	Severe: seepage.	Severe: seepage, ponding.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding, too sandy.
442 Holbrook	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Large stones, too sandy.
443 Holbrook	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, too sandy.
444*:					
Holbrook	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, too sandy.
Glenbrook	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
445*:					
Holbrook	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, too sandy.
Greenbrae	Severe: slope.	Severe: piping.	Deep to water	Favorable	Slope, too sandy, soil blowing.
Reno	Severe: seepage, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, too sandy.
446*:					
Holbrook	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, too sandy.
Verdico	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
451*:					
Hyloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Ister	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
461 Hussman	Slight	Moderate: hard to pack, wetness.	Percs slowly, flooding, frost action.	Wetness, percs slowly, flooding.	Wetness, percs slowly.
462 Hussman	Slight	Severe: excess sodium, excess salt.	Percs slowly, frost action, excess salt.	Wetness, percs slowly, excess sodium.	Wetness, percs slowly.
463 Hussman	Slight	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
471 Incy	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
481 Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
482 Indian Creek	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Slope, large stones, cemented pan.
483 Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
485*:					
Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Too sandy.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
486*:					
Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
Reno	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
Cassiro	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
487*:					
Indian Creek Variant	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Cemented pan, slope.	Slope, cemented pan.
Cassiro	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.
488*:					
Indian Creek Variant	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Large stones, cemented pan, slope.	Slope, large stones, cemented pan.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
491 Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
501, 502 James Canyon	Moderate: seepage, slope.	Slight	Deep to water	Slope	Favorable.
503 Kimmerling Variant	Moderate: seepage, slope.	Severe: wetness.	Wetness, frost action, slope.	Wetness, slope.	Wetness.
511 James Canyon Variant	Severe: seepage.	Severe: seepage, wetness.	Frost action, slope. cutbanks cave.	Wetness, slope.	Wetness, too sandy.
512 James Canyon Variant	Severe: seepage.	Excess salt, seepage.	Frost action, slope, cutbanks cave.	Excess salt, slope.	Too sandy.
521 Job	Moderate: seepage.	Moderate: piping, wetness.	Deep to water	Erodes easily, flooding.	Erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes and levees	Drainage	Irrigation	Terraces and diversions
523----------------- Job	Moderate: seepage.	Moderate: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.
524----------------- Job	Moderate: seepage.	Moderate: hard to pack, wetness.	Flooding, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
531----------------- Jubilee	Severe: seepage.	Severe: piping, wetness.	Wetness, cutbanks cave, poor outlets.	Wetness, seepage.	Wetness, poor outlets.
532----------------- Jubilee	Severe: seepage.	Severe: piping, wetness.	Percs slowly, flooding, frost action.	Wetness, slow intake, percs slowly.	Wetness.
533----------------- Jubilee Variant	Severe: seepage.	Severe: piping, excess humus, wetness.	Flooding, frost action.	Wetness, flooding.	Wetness.
534*:					
Jubilee------------	Severe: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness------------	Erodes easily, wetness.
Dressler-----------	Severe: seepage.	Severe: seepage.	Flooding, large stones, frost action.	Wetness, droughty.	Large stones, wetness, too sandy.
Kimmerling---------	Slight---------------	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.
541*:					
Softscrabble-------	Severe: slope.	Moderate: seepage, large stones.	Deep to water----	Large stones, percs slowly, slope.	Slope, large stones.
Glean--------------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Large stones, droughty, slope.	Slope, large stones.
Genoa--------------	Severe: depth to rock, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
552----------------- Kimmerling	Severe: seepage.	Severe: seepage, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.
553----------------- Kimmerling	Slight---------------	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.
555----------------- Kimmerling	Slight---------------	Severe: wetness.	Flooding, frost action.	Wetness, percs slowly, flooding.	Erodes easily, wetness.
561*:					
Koontz-------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, depth to rock.
Sutro--------------	Severe: slope.	Severe: thin layer.	Deep to water----	Depth to rock, slope.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
562*:					
Koontz	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Sutro	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
571*:					
Kram	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope, excess salt.	Slope, depth to rock.
Puett Variant	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
581*:					
Loomer	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
582*:					
Loomer	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Olac	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
583*:					
Loomer	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Zephan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Olac	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
591*:					
Minneha	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, depth to rock.	Slope, large stones, depth to rock.
Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.
592*:					
Minneha	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
592*: Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Rock outcrop.					
601 Mottsville	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
602 Mottsville	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
603 Mottsville	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.
604*: Mottsville	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Slope, too sandy.
Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
611 Nevador	Severe: seepage.	Moderate: piping.	Deep to water	Favorable	Too sandy.
612 Nevador	Severe: seepage.	Moderate: piping.	Deep to water	Slope	Too sandy.
621 Niwot	Severe: seepage.	Severe: seepage, wetness.	Flooding, frost action, cutbanks cave.	Wetness, droughty, flooding.	Wetness, too sandy.
622 Niwot	Severe: seepage.	Severe: seepage, wetness.	Flooding, frost action, cutbanks cave.	Wetness, droughty, percs slowly.	Wetness, too sandy.
631*: Olac	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Ister	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
641 Ophir	Severe: seepage.	Severe: seepage, wetness.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.
642 Ophir	Severe: seepage.	Severe: seepage, wetness.	Slope, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
644 Ophir Variant	Severe: seepage,	Severe: seepage, wetness.	Wetness, frost action, slope.	Wetness, droughty, slope.	Wetness, too sandy.
651*:					
Oppio	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Slope	Slope, large stones.
661 Ormsby	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
662 Ormsby	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy.
671*:					
Pernty	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Burnborough Variant	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Chen	Severe: depth to rock.	Severe: thin layer.	Deep to water	Large stones, droughty, percs slowly.	Large stones, depth to rock.
672*:					
Pernty	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
673*:					
Pernty	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Rock outcrop.					
681 Phing	Moderate: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope. slope.	Percs slowly.
682 Phing	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
683 Phing	Slight	Moderate: hard to pack.	Deep to water	Percs slowly	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
685*:					
Phing	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
691 Updike Variant	Moderate: seepage.	Severe: excess salt.	Deep to water	Erodes easily, excess salt.	Erodes easily.
693*:					
Updike Variant	Moderate: seepage.	Severe: excess salt.	Deep to water	Erodes easily, excess salt.	Erodes easily.
Playas.					
702 Perazzo	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Too sandy.
712 Prey	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Cemented pan, too sandy.
713 Prey	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, cemented pan.	Slope, cemented pan, too sandy.
721 Prey Variant	Severe: cemented pan, slope.	Moderate: seepage.	Deep to water	Droughty, cemented pan, slope.	Slope, cemented pan.
731 Job Variant	Moderate: seepage.	Severe: piping, excess salt.	Deep to water	Erodes easily, flooding, excess salt.	Erodes easily.
741*:					
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
742*:					
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
743*:					
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
743*:					
Verdico	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Erodes easily, too sandy.
744*:					
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Verdico	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
751*:					
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Cassiro	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, percs slowly, slope.	Slope, large stones, percs slowly.
752*:					
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Pung	Severe: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Slope.
753*:					
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Slope	Slope, large stones.
Pung	Severe: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Slope.
762*:					
Pulcan	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
771 Rawe	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty	Slope, erodes easily.
772 Rawe	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Erodes easily.
781 Reno	Severe: seepage.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, too sandy.
782 Reno	Severe: seepage, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, too sandy.
783 Reno	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
784 Reno	Severe: seepage.	Severe: seepage.	Deep to water	Percs slowly, cemented pan.	Cemented pan, too sandy.
785*: Phing Variant	Moderate: cemented pan, slope.	Severe: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
Reno	Severe: seepage, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, too sandy.
786*: Reno	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
Phing	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
Springmeyer	Severe: slope.	Slight	Deep to water	Slope	Slope, too sandy.
787*: Reno	Severe: seepage.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, too sandy.
Saralegui	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing.
788*: Reno	Severe: seepage, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, too sandy.
Stucky	Moderate: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Large stones.
789*: Phing Variant	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
789*:					
Zephan	Severe: slope.	Moderate: hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
791 Risue	Severe: cemented pan.	Moderate: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
792 Risue	Severe: cemented pan, slope.	Moderate: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, percs slowly.
801*. Riverwash					
811*. Rock outcrop					
821*:					
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
831, 832 Saralegui	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing.
833*:					
Saralegui	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing.
Saralegui	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Favorable.
834*:					
Saralegui	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Favorable.
Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty	Too sandy.
Reno	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
841*:					
Searles	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
Devada	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
842*:					
Searles	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
843*:					
Searles	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Chen	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
851 Settlemeyer	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action, cutbanks cave.	Wetness, erodes easily, flooding.	Erodes easily, wetness.
852 Settlemeyer	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding, excess salt.	Erodes easily.
854 Settlemeyer	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding, excess salt.	Erodes easily, too sandy.
861 Shakespeare	Severe: slope.	Moderate: wetness.	Deep to water	Percs slowly, slope.	Slope.
871 Shree	Severe: seepage.	Slight	Deep to water	Droughty, slope.	Favorable.
872 Shree	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
873*:					
Shree	Severe: seepage.	Slight	Deep to water	Droughty, slope.	Favorable.
Settlemeyer	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding, excess salt.	Erodes easily, too sandy.
874*:					
Shree	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
Pung	Severe: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
881 Springmeyer	Severe: slope.	Slight	Deep to water	Soil blowing, slope.	Slope, too sandy, soil blowing.
882, 883 Springmeyer	Severe: slope.	Slight	Deep to water	Percs slowly, slope.	Slope.
884 Springmeyer	Moderate: seepage, slope.	Slight	Deep to water	Slope	Too sandy.
891 Stodick	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
892*:					
Stodick	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
901*:					
Surgem	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Olac	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Cagle	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
911*, 912*:					
Theon	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
921 Nevador Variant	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Cemented pan.	Cemented pan.
922 Nevador Variant	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope.	Slope, cemented pan.
923 Nevador Variant	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope.	Cemented pan.
931*:					
Temo	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.
Rock outcrop.					
932*:					
Temo	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, depth to rock.
Rock outcrop.					

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
941*, 942*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, depth to rock.
Rock outcrop.					
951 Toll	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
952 Toll	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
953 Toll	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
961*:					
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
962*:					
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Pernty	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
963*:					
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Sup	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Chen	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
972*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty	Slope, depth to rock.
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, soil blowing.
Drit	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, soil blowing, slope.	Slope, soil blowing.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes and levees	Drainage	Irrigation	Terraces and diversions
973*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Drit	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
974*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Drit	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope.
975*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Glean	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
976*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Mottsville	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Slope, too sandy.
977*:					
Trid	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
Roloc	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Sup	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
982 Turria	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily.
985 Turria	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
986: Turria	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily.
992: Updike	Moderate: seepage.	Severe: excess salt.	Deep to water	Percs slowly, erodes easily, excess salt.	Erodes easily, percs slowly.
993*: Updike	Slight	Moderate: piping.	Deep to water	Percs slowly, erodes easily, flooding.	Erodes easily.
Springmeyer	Slight	Moderate: piping.	Deep to water	Erodes easily	Erodes easily.
994: Updike	Moderate: seepage.	Severe: excess salt.	Deep to water	Percs slowly, erodes easily, excess salt.	Erodes easily, percs slowly.
1011*: Verdico	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Puett	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.
1012*: Verdico	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Springmeyer	Moderate: seepage, slope.	Slight	Deep to water	Slope	Too sandy.
1021: Veta	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Large stones, too sandy.
1031*: Vicee	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope.
Rock outcrop.					
1041: Voltaire	Slight	Severe: wetness, excess salt.	Percs slowly, flooding, frost action.	Wetness, percs slowly.	Erodes easily, wetness, too sandy.
1042, 1044: Voltaire	Slight	Severe: wetness.	Percs slowly, flooding, frost action.	Wetness, slow intake, percs slowly.	Erodes easily, wetness, too sandy.
1051: Voltaire Variant	Moderate: seepage.	Severe: piping, wetness, excess salt.	Percs slowly, frost action, excess salt.	Wetness, percs slowly, excess salt.	Erodes easily, wetness.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1061 Washoe	Moderate: seepage.	Moderate: thin layer, large stones.	Deep to water	Droughty	Large stones.
1062 Washoe	Moderate: seepage, slope.	Moderate: thin layer, large stones.	Deep to water	Droughty, slope.	Large stones.
1063 Washoe	Moderate: seepage.	Moderate: thin layer, large stones.	Deep to water	Droughty	Large stones.
1066*:					
Washoe	Moderate: seepage, slope.	Moderate: thin layer, large stones.	Deep to water	Droughty, slope.	Large stones.
Reno	Severe: seepage, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, too sandy.
1071 Corbett	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, depth to rock, too sandy.
1072*:					
Corbett	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, too sandy.
Toiyabe	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.
1073*:					
Corbett	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Depth to rock, too sandy.
Toiyabe	Severe: depth to rock.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Depth to rock, too sandy.
1081*:					
Zephan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Zephan	Severe: slope.	Moderate: hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
1091*:					
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
1101*:					
Pung	Severe: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1101*:					
Phing	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
1102*:					
Pung	Severe: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Slope.
Pula	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Uhaldi	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
1111 Stucky	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
1112*:					
Stucky	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
101-------------- Aldax	0-3	Stony fine sandy loam.	GM, SM	A-2	20-40	50-70	45-65	25-35	25-35	20-30	NP-5
	3-14	Extremely stony fine sandy loam, very stony loam.	GM, SM	A-1, A-2	30-60	30-70	20-60	15-45	10-35	20-30	NP-5
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
102*:											
Aldax-----------	0-3	Very stony fine sandy loam.	GM, SM	A-2	20-40	50-70	45-65	25-35	25-35	20-30	NP-5
	3-14	Extremely stony fine stony loam, very stony loam.	GM, SM	A-1, A-2	30-60	30-70	20-60	15-45	10-35	20-30	NP-5
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Indiano----------	0-13	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
111-------------- Borda	0-10	Gravelly sandy loam.	SM-SC	A-2	0-10	70-80	60-75	35-45	15-25	25-30	5-10
	10-34	Clay--------------	CH	A-7	0-5	90-100	85-100	75-85	65-75	60-75	35-50
	34-50	Clay loam, loam	CL	A-6, A-7	0-5	90-100	85-100	60-80	50-70	35-45	15-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
121*:											
Borda Variant---	0-6	Extremely cobbly sandy loam.	SW-SM, SM-SC	A-2	40-50	60-70	25-35	15-25	5-15	25-35	5-10
	6-27	Very gravelly sandy clay, very gravelly clay.	SC	A-2	0-15	60-70	45-55	35-45	20-35	55-65	35-40
	27-60	Very gravelly sandy clay loam, extremely gravelly sandy clay loam.	SC	A-2	0-15	60-70	20-55	15-45	10-30	30-40	10-20
Genoa-----------	0-6	Extremely cobbly sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	6-16	Extremely cobbly sandy clay loam, very cobbly loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough Variant---------	0-5	Stony loam--------	CL-ML	A-4	5-10	75-90	70-85	60-80	50-60	20-30	5-10
	5-30	Gravelly clay loam, gravelly loam.	CL, GC	A-6, A-7	0-10	60-80	55-75	50-70	35-55	35-45	15-25
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
122*:											
Borda Variant---	0-6	Very cobbly sandy loam.	SM-SC	A-2	35-45	75-85	45-55	30-40	15-25	25-35	5-10
	6-39	Very gravelly sandy clay, very gravelly clay.	SC	A-2	0-15	60-70	45-55	35-45	20-35	55-65	35-40
	39-60	Very gravelly sandy clay loam, extremely gravelly sandy clay loam.	SC	A-2	0-15	60-70	20-55	15-45	10-30	30-40	10-20
Borda Variant---	0-4	Very gravelly sandy loam.	SM-SC	A-2	5-15	75-85	40-50	25-35	15-25	25-35	5-10
	4-34	Very gravelly sandy clay, very gravelly clay.	SC	A-2	0-15	60-70	45-55	35-45	20-35	55-65	35-40
	34-60	Very gravelly sandy clay loam, extremely gravelly sandy clay loam.	SC	A-2	0-15	60-70	20-55	15-45	15-30	30-40	10-20
Glean-----------	0-27	Very stony sandy loam.	GM, SM	A-2	20-35	55-70	50-65	40-55	25-35	20-30	NP-5
	27-42	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	42-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
123*:											
Borda Variant---	0-5	Very gravelly sandy loam.	SM-SC	A-2	5-15	75-85	40-50	25-35	15-25	25-35	5-10
	5-37	Very gravelly sandy clay, very gravelly clay.	SC	A-2	0-15	60-70	45-55	35-45	20-35	55-65	35-40
	37-60	Very gravelly sandy clay loam, extremely gravelly sandy clay loam.	SC	A-2	0-15	60-70	20-55	15-45	10-30	30-40	10-20
Glean-----------	0-28	Very gravelly sandy loam.	GM	A-1, A-2	0-10	30-55	25-50	20-40	10-30	20-30	NP-5
	28-60	Very cobbly sandy loam, very cobbly loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
Chen------------	0-6	Very stony sandy loam.	GM, SM	A-1	30-40	55-65	40-50	25-35	15-20	20-25	NP-5
	6-17	Very gravelly clay.	GC	A-2	5-15	45-55	30-40	30-40	25-35	55-65	35-40
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
124*:											
Borda Variant---	0-5	Extremely cobbly sandy loam.	SW-SM, SM-SC	A-2	40-50	60-70	25-35	15-25	5-15	25-35	5-10
	5-30	Very gravelly sandy clay, very gravelly clay.	SC	A-2	0-15	60-70	45-55	35-45	20-35	55-65	35-40
	30-60	Very gravelly sandy clay loam.	SC	A-2	0-15	60-70	45-55	35-45	20-30	30-40	10-20
Burnborough Variant--------	0-6	Stony loam--------	CL-ML	A-4	5-10	75-90	70-85	60-80	50-60	20-30	5-10
	6-37	Gravelly clay loam, gravelly loam.	CL, GC	A-6, A-7	0-10	60-80	55-75	50-70	35-55	35-45	15-25
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cassiro---------	0-7	Stony loam--------	SM-SC	A-4	15-25	80-95	65-75	60-70	40-50	20-30	5-10
	7-40	Extremely gravelly clay, very gravelly clay.	GC	A-2	10-20	30-50	25-45	20-40	20-35	50-65	30-40
	40-60	Stratified gravelly sandy loam to very cobbly clay loam.	GC, SC	A-6	10-35	60-90	50-80	45-65	35-45	25-40	10-20
141-------------- Brockliss	0-15	Stony loamy sand	SM	A-1	5-40	75-85	60-70	35-45	10-20	---	NP
	15-60	Very stony loamy sand, very stony coarse sand, extremely stony loamy sand.	SP-SM, GP-GM	A-1	40-60	50-70	40-60	20-40	5-10	---	NP
151*:											
Cagle-----------	0-2	Very stony loam	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	2-17	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	17-30	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Deven-----------	0-2	Very stony loam	GM-GC, GM, SM-SC, SM	A-4	30-60	55-80	50-75	45-65	35-50	25-35	5-10
	2-17	Clay, clay loam	CL, CH	A-7	0	80-95	75-90	70-85	60-80	40-60	20-35
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nosrac----------	0-8	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	8-35	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	35-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
152*:											
Cagle-----------	0-4	Extremely stony loam.	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	4-16	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	16-24	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duco------------	0-4	Very cobbly fine sandy loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	4-14	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
153*:											
Cagle-----------	0-3	Very stony loam	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	3-17	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	17-30	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duco------------	0-5	Extremely stony loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
154*:											
Cagle-----------	0-4	Very stony loam	GC, SC	A-6	35-50	55-75	50-70	45-60	35-45	30-35	10-15
	4-28	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
154*:											
Nosrac	0-9	Stony clay loam	GC	A-6	5-20	60-70	55-65	50-60	40-50	30-35	10-15
	9-34	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	34-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
155*:											
Cagle	0-3	Very stony loam	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	3-18	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	18-30	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nosrac	0-7	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	7-32	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	32-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
Borda	0-5	Very cobbly clay loam.	GC, CL	A-6, A-7	25-35	65-75	60-70	45-60	40-55	35-45	15-20
	5-35	Clay	CH	A-7	0-5	90-100	85-100	75-85	65-75	60-75	35-50
	35-50	Clay loam, loam	CL	A-6, A-7	0-5	90-100	85-100	60-80	50-70	35-45	15-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
156*:											
Cagle	0-3	Very stony loam	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	3-28	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	28-35	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Burnborough	0-14	Stony loam	CL, CL-ML	A-4, A-6	5-15	85-95	70-85	60-75	50-60	20-35	5-15
	14-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
161*:											
Witefels	0-5	Loamy coarse sand	SP-SM, SM	A-1	0-5	95-100	85-95	20-40	5-20	---	NP
	5-40	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
162*:											
Witefels	0-3	Gravelly loamy coarse sand.	SP-SM, SM	A-1	10-15	65-85	55-75	30-50	5-15	---	NP
	3-31	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
163*:											
Witefels	0-8	Gravelly loamy coarse sand.	SP-SM, SM	A-1	10-15	65-85	55-75	30-50	5-15	---	NP
	8-32	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
164*:											
Witefels	0-3	Gravelly loamy coarse sand.	SP-SM, SM	A-1	10-15	65-85	55-75	30-50	5-15	---	NP
	3-40	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
165*:											
Witefels	0-4	Gravelly sand	SM, SP-SM	A-1	0-5	90-95	65-75	20-40	5-15	---	NP
	4-39	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Temo	0-9	Gravelly coarse sand.	SP-SM	A-1	0	80-90	55-75	20-35	5-10	---	NP
	9-19	Gravelly loamy coarse sand, coarse sand, gravelly coarse sand.	SP-SM, SM	A-1	0-5	70-100	50-80	20-45	5-15	---	NP
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
181*:											
Chalco	0-1	Very cobbly loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	1-14	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
181*:											
Chalco----------	0-5	Gravelly fine sandy loam.	GM, SM	A-4	0-10	65-80	60-75	45-60	35-50	20-25	NP-5
	5-17	Clay--------------	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	17	Weathered bedrock	---	---	---	---	---	---	---	---	---
182*:											
Chalco----------	0-5	Very gravelly loam.	GM	A-2	0-10	50-60	40-50	35-45	25-35	20-25	NP-5
	5-18	Clay--------------	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pula------------	0-5	Very cobbly loam	GC	A-2, A-6	25-50	50-75	45-70	40-60	30-50	30-35	10-15
	5-25	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	25-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15
183*:											
Chalco----------	0-3	Gravelly fine sandy loam.	GM, SM	A-4	0-10	65-80	60-75	45-60	35-50	20-25	NP-5
	3-18	Clay--------------	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chalco----------	0-2	Very cobbly loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	2-11	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	11	Weathered bedrock	---	---	---	---	---	---	---	---	---
191-------------- Cradlebaugh	0-17	Clay loam---------	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20
	17-39	Stratified silty clay loam to fine sandy loam.	CL	A-6	0	100	100	85-95	60-75	30-40	10-20
	39-60	Fine sandy loam	SM	A-4	0	100	100	70-80	40-50	15-25	NP-5
192-------------- Cradlebaugh	0-9	Clay loam---------	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20
	9-31	Stratified silty clay loam to fine sandy loam.	CL	A-6	0	100	100	90-100	60-75	30-40	10-20
	31-60	Fine sandy loam	SM	A-4	0	100	100	70-80	40-50	15-25	NP-5
193-------------- Cradlebaugh	0-17	Clay loam---------	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20
	17-47	Stratified silty clay loam to fine sandy loam.	CL	A-6	0	100	100	90-100	60-75	30-40	10-20
	47-60	Fine sandy loam	SM	A-4	0	100	100	70-80	40-50	15-25	NP-5
194-------------- Cradlebaugh	0-9	Clay loam---------	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20
	9-31	Stratified silty clay loam to fine sandy loam.	CL	A-6	0	100	100	90-100	60-75	30-40	10-20
	31-60	Fine sandy loam	SM	A-4	0	100	100	70-80	40-50	15-25	NP-5
201-------------- Dangberg	0-6	Silt loam---------	CL	A-6	0	100	100	90-100	70-80	30-35	10-15
	6-24	Clay, clay loam, sandy clay.	CH	A-7	0	100	100	90-100	70-85	50-60	30-40
	24-31	Cemented----------	---	---	---	---	---	---	---	---	---
	31-60	Sandy loam--------	SM	A-2, A-4	0	100	100	60-70	30-40	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
202, 203-----------Dangberg	0-3	Clay--------------	CH	A-7	0	100	100	90-100	85-95	55-65	35-40
	3-25	Clay, sandy clay-	CH	A-7	0	100	100	90-100	70-85	50-60	30-35
	25-43	Cemented---------	---	---	---	---	---	---	---	---	---
	43-60	Coarse sand------	SW-SM, SP-SM	A-3	0	90-100	80-95	50-60	5-10	---	NP
204, 205-----------Dangberg	0-3	Clay--------------	CH	A-7	0	100	100	90-100	85-95	55-65	35-40
	3-25	Clay--------------	CH	A-7	0	100	100	90-100	85-95	50-60	30-35
	25-43	Cemented---------	---	---	---	---	---	---	---	---	---
	43-60	Coarse sand------	SW-SM, SP-SM	A-3, A-2	0	90-100	80-90	50-60	5-10	---	NP
211*: Devada-----------	0-4	Very cobbly loam	GM-GC, GC	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-45	25-35	5-15
	4-13	Clay, gravelly clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Drit-------------	0-15	Very stony sandy loam.	SM	A-1	20-45	60-75	45-55	25-40	10-25	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly fine sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10
Roloc------------	0-11	Extremely stony sandy loam.	SM	A-1	35-45	75-85	40-50	25-35	10-20	---	NP
	11-18	Very gravelly coarse sandy loam, very gravelly loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	10-30	20-30	5-10
	18-28	Weathered bedrock	---	---	---	---	---	---	---	---	---
212*: Devada-----------	0-4	Very cobbly loam	GM-GC, GC	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-45	25-35	5-15
	4-13	Clay, gravelly clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Koontz-----------	0-7	Cobbly loam------	SM, ML	A-4	15-30	80-90	70-80	45-60	40-55	20-30	NP-5
	7-14	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	25-45	25-40	30-40	10-20
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
213*: Devada-----------	0-4	Extremely stony loam.	GM-GC, GC	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-45	25-35	5-15
	4-16	Clay, gravelly clay.	CL, CH	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
213*: Burnborough Variant--------	0-15	Stony loam-------	CL-ML	A-4	5-10	75-90	70-85	60-80	50-60	20-30	5-10
	15-40	Gravelly clay loam, gravelly loam.	CL, GC	A-6, A-7	0-10	60-80	55-75	50-70	35-55	35-45	15-25
	40	Weathered bedrock	---	---	---	---	---	---	---	---	---
214*: Devada----------	0-4	Very cobbly loam	GM-GC, GC,	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-45	25-35	5-15
	4-16	Clay, gravelly clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
221-------------- East Fork Variant	0-38	Loam--------------	CL	A-6	0-5	85-95	75-85	60-80	50-70	30-35	10-15
	38-48	Stratified sandy loam to clay loam.	CL	A-6	0-5	80-90	75-85	60-70	50-60	30-35	10-15
	48-60	Very gravelly sand, very gravelly loamy sand.	GP-GM, GM, SP-SM, SM	A-1	10-20	50-60	30-50	15-25	5-15	---	NP
231*: Brockliss Variant--------	0-6	Very gravelly loam.	GM-GC	A-2	0-5	50-65	35-50	25-35	20-30	25-30	5-10
	6-60	Stratified very gravelly loam to extremely gravelly sandy loam.	GM-GC	A-2	0-10	50-65	25-45	20-35	10-30	20-30	5-10
Brockliss Variant--------	0-6	Very gravelly sandy loam.	SM-SC, GM-GC	A-2	0-5	50-65	35-50	20-35	10-20	20-25	NP-5
	6-60	Stratified very gravelly loam to extremely gravelly sandy loam.	GM-GC	A-2	0-10	50-65	25-45	20-35	10-30	20-30	5-10
Dangberg---------	0-6	Loam--------------	CL	A-6	0	100	100	90-100	70-80	30-35	10-15
	6-24	Clay, clay loam	CH	A-7	0	100	100	90-100	70-85	50-60	30-40
	24-31	Cemented---------	---	---	---	---	---	---	---	---	---
	31-60	Sandy loam-------	SM	A-2, A-4	0	100	100	60-70	30-40	---	NP
241-------------- Dressler	0-20	Coarse sandy loam	SM	A-2	0-5	90-100	80-90	40-50	25-35	---	NP
	20-66	Stratified sand to cobbly coarse sandy loam.	SM, SP-SM	A-1	10-30	80-90	65-80	35-45	5-15	---	NP
242-------------- Dressler	0-20	Sandy loam-------	SM	A-2	0-5	90-100	80-90	40-50	25-35	---	NP
	20-66	Stratified sand to cobbly coarse sandy loam.	SM, SP-SM	A-1	10-30	80-90	65-80	35-45	5-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
251*:											
Duco	0-5	Extremely stony loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cagle	0-3	Extremely stony loam.	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	3-31	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	31-38	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nosrac	0-8	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	8-33	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	33-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
252*:											
Duco	0-3	Stony loam	SM-SC, GM-GC, CL-ML	A-4	5-10	60-80	55-75	45-65	35-55	20-30	5-10
	3-10	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Devada	0-3	Very stony loam	GM-GC, GM, SM-SC, SM	A-4	30-60	55-80	50-75	45-65	35-50	25-35	5-10
	3-13	Clay, gravelly clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nosrac	0-9	Stony fine sandy loam.	SM-SC	A-2	5-20	60-70	55-65	45-55	15-25	20-25	5-10
	9-31	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	31-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
253*:											
Duco------------	0-5	Very cobbly fine sandy loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	5-15	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nosrac----------	0-10	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	10-32	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	32-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
254*:											
Duco------------	0-4	Stony loam--------	SM-SC, GM-GC, CL-ML	A-4	5-10	60-80	55-75	45-65	35-55	20-30	5-10
	4-17	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nosrac----------	0-10	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	10-33	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	33-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
Burnborough Variant--------	0-15	Stony loam--------	CL-ML	A-4	5-10	75-90	70-85	60-80	50-60	20-30	5-10
	15-33	Gravelly clay loam, gravelly loam.	CL, GC	A-6, A-7	0-10	60-80	55-75	50-70	35-55	35-45	15-25
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
255*:											
Duco------------	0-5	Stony loam--------	SM-SC, GM-GC, CL-ML	A-4	5-10	60-80	55-75	45-65	35-55	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
255*: Searles----------	0-4	Very gravelly loam.	GC	A-2	0-5	45-60	35-50	30-40	25-35	25-30	10-15
	4-27	Extremely gravelly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-2	0-15	45-55	25-35	20-35	15-30	35-45	15-20
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
261*: Dumps.											
Pits.											
271--------------- East Fork	0-11	Loam--------------	CL	A-6	0	100	100	85-95	65-70	30-35	10-15
	11-45	Clay loam, sandy clay loam.	CL	A-6, A-7	0	100	95-100	85-100	65-80	35-45	15-20
	45-60	Stratified loam to clay loam.	CL	A-6, A-7	0	100	90-100	85-100	65-80	35-45	15-20
272--------------- East Fork	0-11	Clay loam--------	CL	A-6, A-7	0	100	100	90-95	70-75	35-45	15-20
	11-30	Clay loam, sandy clay loam.	CL	A-6, A-7	0	100	95-100	85-100	65-80	35-45	15-20
	30-60	Stratified sand to clay.	CL	A-6, A-7	0	100	90-100	85-100	65-80	35-45	15-20
281--------------- Fettic	0-4	Very fine sandy loam.	ML	A-4	0	100	100	85-95	50-60	---	NP
	4-29	Clay loam--------	CL	A-7, A-6	0	100	100	95-100	75-85	35-45	15-25
	29-60	Stratified very fine sandy loam to fine sand.	SM	A-2, A-4	0	100	100	60-75	20-45	---	NP
282--------------- Fettic	0-4	Clay-------------	CH	A-7	0	100	100	95-100	85-95	55-60	30-35
	4-29	Clay loam--------	CL	A-7, A-6	0	100	100	95-100	75-85	35-45	15-25
	29-60	Stratified very fine sandy loam to fine sand.	SM	A-2, A-4	0	100	100	60-75	20-45	---	NP
292*: Vicee Variant---	0-14	Extremely stony very fine sandy loam.	GM-GC	A-2	55-65	25-35	20-30	15-25	10-20	20-30	5-10
	14-21	Very cobbly loam, extremely cobbly loam.	GM-GC	A-2	45-55	40-50	35-45	30-40	20-30	20-30	5-10
	21-36	Very cobbly loam, extremely cobbly loam.	GM-GC	A-2	55-65	35-45	30-40	25-35	15-25	20-30	5-10
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
301*: Franktown--------	0-5	Very stony sandy loam.	GP-GM, GM	A-1	15-40	35-45	25-35	15-25	5-15	---	NP
	5-10	Extremely gravelly sandy loam, very gravelly fine sandy loam.	GP-GM, GM	A-1	5-10	20-45	10-35	10-30	5-20	---	NP
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
301*:											
Rubble land.											
Rock outcrop.											
311-------------- Gardnerville	0-3	Clay loam--------	CL	A-7	0	100	100	90-100	70-80	40-50	20-25
	3-16	Clay, clay loam	CH	A-7	0	100	100	85-95	70-85	50-60	30-35
	16-60	Stratified coarse sandy loam to coarse sand.	SM	A-2	0	90-100	80-90	55-65	10-20	---	NP
312-------------- Gardnerville	0-3	Clay loam--------	CL	A-7	0	100	100	90-100	70-80	40-50	20-25
	3-16	Clay, clay loam	CH	A-7	0	100	100	85-95	70-80	50-60	30-35
	16-60	Stratified coarse sandy loam to coarse sand.	SM	A-2	0	90-100	80-90	55-65	10-20	---	NP
313-------------- Gardnerville	0-3	Clay loam--------	CL	A-7	0	100	100	90-100	70-80	40-50	15-25
	3-16	Clay, clay loam	CH	A-7	0	100	100	90-100	70-85	50-60	30-35
	16-60	Stratified coarse sandy loam to coarse sand.	SM	A-2	0	100	90-100	60-70	10-20	---	NP
314-------------- Gardnerville	0-7	Clay--------------	CH	A-7	0	100	100	90-100	80-90	55-60	30-35
	7-18	Clay, clay loam	CH	A-7	0	100	100	85-95	70-85	50-60	30-35
	18-60	Stratified coarse sandy loam to coarse sand.	SM	A-2	0	90-100	80-90	55-65	10-20	---	NP
315-------------- Gardnerville	0-6	Clay--------------	CH	A-7	0	100	100	90-100	75-85	55-60	30-35
	6-16	Clay, clay loam	CH	A-7	0	100	100	90-100	70-85	50-60	30-35
	16-60	Stratified coarse sandy loam to coarse sand.	SM	A-2	0	100	90-100	60-70	10-20	---	NP
321*:											
Genoa-----------	0-4	Extremely cobbly sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	4-16	Extremely cobbly sandy clay loam, extremely cobbly loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Glean-----------	0-6	Stony sandy loam	GM, SM	A-2, A-4	15-25	65-80	60-75	40-65	25-45	20-30	NP-5
	6-39	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	39-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
322*:											
Genoa-----------	0-4	Extremely stony loam.	SC	A-2	40-50	60-70	40-50	25-50	20-45	25-35	10-15
	4-12	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
322*:											
Glean-----------	0-6	Stony sandy loam	GM, SM	A-2, A-4	15-25	65-80	60-75	40-65	25-45	20-30	NP-5
	6-25	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	25-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
Rock outcrop.											
331*:											
Glean-----------	0-6	Very gravelly sandy loam.	GM	A-1, A-2	0-10	30-55	25-50	20-40	10-30	20-30	NP-5
	6-28	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	10-35	20-30	NP-5
	28-60	Very cobbly sandy loam, very cobbly loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
Genoa-----------	0-2	Extremely stony sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	2-19	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Glean-----------	0-6	Very gravelly sandy loam.	GM	A-1, A-2	0-10	30-55	25-50	20-40	10-30	20-30	NP-5
	6-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	10-35	20-30	NP-5
	30-60	Very cobbly sandy loam, very cobbly loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
332*:											
Glean-----------	0-6	Extremely stony sandy loam.	GM, SM	A-2	35-50	55-75	50-70	40-60	25-35	20-30	NP-5
	6-25	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	25-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
332*:											
Genoa	0-4	Extremely stony sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	4-16	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rubble land.											
334*:											
Glean	0-2	Very stony sandy loam.	GM, SM	A-2	20-35	55-70	50-65	40-55	25-35	20-30	NP-5
	2-23	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	23-60	Very cobbly loam, very cobbly sandy loam, very gravelly loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
Sup	0-12	Stony loam	SM	A-1, A-2	5-15	60-80	30-60	25-50	20-35	15-25	NP-5
	12-60	Stratified very cobbly loam to extremely gravelly coarse sandy loam.	GP-GM, GM	A-1	25-40	35-55	20-50	15-35	5-25	15-25	NP-5
Genoa	0-2	Extremely stony sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	2-19	Extremely cobbly sandy clay loam, very cobbly loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
341*:											
Glenbrook	0-8	Sand	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-55	5-20	---	NP
	8-15	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Glenbrook	0-9	Sand	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-55	5-20	---	NP
	9-15	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
342*:											
Glenbrook	0-9	Gravelly loamy coarse sand.	SM, SP-SM	A-1	5-10	80-95	60-75	40-50	5-20	---	NP
	9-15	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
351------------ Godecke	0-8	Fine sandy loam	CL-ML	A-4	0	100	100	80-90	55-65	20-30	5-10
	8-18	Clay loam, sandy clay loam.	CL	A-7	0	100	100	85-95	60-70	40-45	20-25
	18-60	Stratified loamy sand to silt loam.	SM	A-2, A-4	0	100	100	60-80	25-45	<20	NP-5
362*: Gralic----------	0-3	Extremely stony very fine sandy loam.	GM	A-1	40-50	35-45	25-35	20-30	10-20	15-25	NP-5
	3-60	Very gravelly very fine sandy loam, extremely gravelly very fine sandy loam.	GM, GP-GM	A-1	0-30	35-45	15-35	10-25	5-20	15-25	NP-5
Gralic----------	0-6	Extremely stony very fine sandy loam.	GM	A-1	40-50	35-45	25-35	20-30	10-20	15-25	NP-5
	6-60	Very gravelly very fine sandy loam, extremely gravelly very fine sandy loam.	GM, GP-GM	A-1	0-30	35-45	15-35	10-25	5-20	15-25	NP-5
363*: Gralic----------	0-4	Very stony fine sandy loam.	GM	A-1	15-30	35-45	25-35	20-30	10-25	15-25	NP-5
	4-60	Very gravelly very fine sandy loam, extremely gravelly very fine sandy loam.	GM, GP-GM	A-1	0-30	35-45	15-35	10-25	5-20	15-25	NP-5
Rock outcrop.											
371------------ Graylock	0-5	Extremely stony loamy coarse sand.	SM	A-1	40-55	70-90	50-80	35-50	10-15	---	NP
	5-42	Extremely stony loamy coarse sand, very stony loamy sand.	SM	A-1	30-50	60-80	25-50	20-35	10-15	---	NP
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
372------------ Graylock	0-3	Extremely stony loamy coarse sand.	SM	A-1	40-55	70-90	50-80	35-50	10-15	---	NP
	3-42	Extremely stony loamy coarse sand, very stony loamy sand.	SM	A-1	30-50	60-80	25-50	20-35	10-15	---	NP
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
381------------ Greenbrae	0-7	Fine sandy loam	SM	A-2	0	95-100	90-100	55-75	20-35	20-25	NP-5
	7-30	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	30-60	Stratified fine sandy loam to gravelly sandy loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
382 Greenbrae	0-9	Gravelly fine sandy loam.	SM	A-1, A-2	0	85-95	60-75	35-50	20-30	15-25	NP-5
	9-28	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	28-63	Stratified fine sandy loam to gravelly sandy loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP
391 Haybourne	0-10	Sand	SP-SM, SM	A-1	0	90-100	75-95	40-50	5-15	---	NP
	10-29	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	29-60	Stratified coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
392, 393 Haybourne	0-6	Loam	ML	A-4	0	95-100	85-95	80-90	50-60	20-30	NP-5
	6-25	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	25-60	Stratified coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
394 Haybourne	0-20	Fine sandy loam	SM	A-4	0	90-100	80-90	60-70	35-45	---	NP
	20-40	Stratified fine sand to fine sandy loam.	SM	A-2, A-1	0	90-100	60-70	40-55	20-35	---	NP
	40-60	Stratified very gravelly fine sand to cobbly sand.	SP, SP-SM	A-1	15-25	65-75	40-50	20-30	2-10	---	NP
401 Heidtman	0-7	Clay loam	CL	A-7	0	100	90-100	80-90	70-80	40-45	20-25
	7-47	Stratified loam to clay loam.	CL	A-6, A-7	0	90-100	80-90	70-80	50-65	35-45	15-25
	47-60	Gravelly sand, sand.	SW-SM, SM, SP-SM	A-1, A-2, A-3	0	60-90	50-85	30-60	5-15	---	NP
402 Heidtman	0-7	Clay loam	CL	A-7	0	100	100	90-100	70-80	40-45	20-25
	7-40	Stratified loam to clay loam.	CL	A-6, A-7	0	100	90-100	70-80	50-65	35-45	15-25
	40-60	Clay	CH	A-7	0	100	100	90-100	75-85	50-60	35-45
411, 412 Henningsen	0-13	Loam	CL-ML	A-4	0	90-100	80-90	70-80	60-70	20-30	5-10
	13-60	Very gravelly loamy coarse sand, very gravelly coarse sand.	GP, GP-GM, GM	A-1	0-10	35-50	20-35	10-20	0-15	---	NP
413, 414 Henningsen	0-13	Gravelly loam	SM-SC	A-2, A-4	0-5	70-80	60-70	40-50	30-40	20-30	5-10
	13-60	Very gravelly loamy coarse sand, extremely gravelly coarse sand.	GP, GP-GM, GM	A-1	0-10	35-50	20-35	10-20	0-15	---	NP
422 Henningsen Variant	0-9	Loam	CL-ML, CL	A-4, A-6	0	100	90-100	75-85	55-65	25-35	5-15
	9-28	Fine sandy loam, loam.	SM-SC	A-4	0	100	80-90	60-75	40-50	20-30	5-10
	28-60	Very gravelly loamy coarse sand.	GP-GM	A-1	0-5	40-50	30-40	15-20	5-10	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
431*: Shalcar family	0-6	Peat	Pt	A-8	0	---	---	---	---	---	---
	6-24	Stratified muck to silt loam.	OL, OH, Pt	A-5, A-8	0	100	100	100	75-85	45-65	NP-5
	24-30	Sandy clay loam, clay loam.	CL	A-6, A-7	0	100	90-100	75-85	50-65	35-45	15-25
	30-60	Gravelly loamy coarse sand.	SM	A-1	0	80-90	60-75	35-45	15-20	---	NP
442: Holbrook	0-15	Gravelly fine sandy loam.	SM	A-2	0-5	70-85	60-70	45-55	25-35	15-20	NP-5
	15-60	Stratified stony sand to extremely gravelly loam.	GM	A-1	25-45	30-50	20-40	15-35	10-20	---	NP
443: Holbrook	0-7	Very stony sandy loam.	SM	A-1, A-2	25-30	60-70	50-60	35-45	20-30	15-20	NP-5
	7-60	Stratified stony sand to extremely gravelly loam.	GM	A-1	25-45	30-50	20-40	15-35	10-20	---	NP
444*:											
Holbrook	0-7	Gravelly fine sandy loam.	SM	A-2	0-5	70-85	60-70	45-55	25-35	15-20	NP-5
	7-60	Stratified stony sand to extremely gravelly loam.	GM	A-1	25-45	30-50	20-40	15-35	10-20	---	NP
Glenbrook	0-9	Sand	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-55	5-20	---	NP
	9-19	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
445*:											
Holbrook	0-14	Extremely stony sandy loam.	GM, GM-GC	A-1, A-2	40-50	40-50	30-40	20-25	10-15	20-30	NP-10
	14-60	Stratified stony sand to extremely gravelly loam.	GM	A-1	25-45	30-50	20-40	15-35	10-20	---	NP
Greenbrae	0-8	Gravelly sandy loam.	SM	A-1, A-2	0	85-95	60-75	35-50	20-30	15-25	NP-5
	8-24	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	24-60	Stratified coarse sand to gravelly loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP
Reno	0-4	Cobbly sandy loam	SM	A-2	15-30	75-95	70-90	50-70	25-35	15-25	NP-5
	4-38	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	38-60	Indurated	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
446*:											
Holbrook---------	0-5	Extremely stony coarse sandy loam.	GM, GM-GC	A-1, A-2	40-50	40-50	30-40	20-25	10-15	20-30	NP-10
	5-60	Stratified stony sand to extremely gravelly loam.	GM	A-1	25-45	30-50	20-40	15-35	10-20	---	NP
Verdico----------	0-2	Clay loam---------	CL	A-7	0-5	90-100	80-90	75-85	60-70	40-45	15-20
	2-30	Clay--------------	CH	A-7	0-5	95-100	85-95	80-90	70-85	50-65	35-40
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
451*:											
Hyloc------------	0-9	Very cobbly sandy loam.	SM-SC	A-2	45-55	70-80	50-60	35-45	15-25	25-30	5-10
	9-19	Gravelly clay----	CH	A-7	5-15	65-80	60-75	55-70	50-65	50-60	25-35
	19	Weathered bedrock	---	---	---	---	---	---	---	---	---
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ister------------	0-16	Extremely stony sandy loam.	GM, SM	A-1, A-2	30-40	45-70	40-65	30-45	15-35	20-30	NP-5
	16-37	Very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	15-20
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
461-------------- Hussman	0-12	Silty clay loam	CL	A-7	0	100	100	95-100	85-95	40-50	20-25
	12-60	Stratified silty clay loam to clay.	CL, CH	A-7	0	100	100	95-100	85-95	45-55	25-35
462-------------- Hussman	0-10	Clay loam---------	CL	A-7	0	100	100	90-100	70-80	40-45	20-25
	10-60	Stratified silty clay loam to clay.	CL, CH	A-7	0	100	100	95-100	85-95	45-55	25-35
463-------------- Hussman	0-12	Clay--------------	CL, CH	A-7	0	100	100	90-100	80-90	45-55	25-35
	12-60	Stratified silty clay loam to clay.	CL, CH	A-7	0	100	100	95-100	85-95	45-55	25-35
471-------------- Incy	0-4	Fine sand---------	SP-SM, SM	A-2, A-3	0	100	80-100	65-90	5-15	---	NP
	4-60	Fine sand, sand	SP-SM, SM	A-2, A-3	0	100	85-95	50-80	5-15	---	NP
481-------------- Indian Creek	0-4	Sandy loam--------	SM-SC	A-2, A-4	0-5	90-100	80-90	55-65	25-40	20-25	5-10
	4-16	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	16-28	Indurated---------	---	---	---	---	---	---	---	---	---
	28-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
482---------------- Indian Creek	0-5	Gravelly fine sandy loam.	SM-SC	A-1, A-2	0-5	60-80	50-70	35-55	15-35	20-25	5-10
	5-19	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	19-24	Indurated---------	---	---	---	---	---	---	---	---	---
	24-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
483---------------- Indian Creek	0-3	Very cobbly loam	SC, SM-SC	A-2, A-6, A-4	40-55	70-90	60-85	55-75	30-50	25-35	5-15
	3-20	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	20-25	Indurated---------	---	---	---	---	---	---	---	---	---
	25-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
485*: Indian Creek-----	0-4	Very cobbly loam	SC, SM-SC	A-2, A-6, A-4	40-55	70-90	60-85	55-75	30-50	25-35	5-15
	4-16	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	16-20	Indurated---------	---	---	---	---	---	---	---	---	---
	20-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
Haybourne---------	0-5	Gravelly sandy loam.	SM	A-1, A-2	0	80-90	65-75	40-50	20-35	---	NP
	5-20	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	20-60	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
486*: Indian Creek-----	0-3	Very cobbly loam	SC, SM-SC	A-2, A-6, A-4	40-55	70-90	60-85	55-75	30-50	25-35	5-15
	3-20	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	20-25	Indurated---------	---	---	---	---	---	---	---	---	---
	25-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
486*:											
Reno-------------	0-3	Very cobbly loam	GC	A-2, A-6	25-35	50-70	40-60	35-55	30-40	30-35	10-15
	3-22	Clay-------------	CL, CH	A-7	0-5	95-100	85-95	80-90	70-85	45-60	25-35
	22-32	Indurated---------	---	---	---	---	---	---	---	---	---
	32-60	Very gravelly sand.	SM, GM, GP-GM, SP-SM	A-1	5-10	50-75	30-55	20-40	5-15	---	NP
Cassiro----------	0-5	Extremely stony loam.	SM-SC, GM-GC	A-4	25-50	60-80	50-70	45-60	35-45	20-30	5-10
	5-41	Extremely gravelly clay, very gravelly clay.	GC	A-2	10-20	30-50	25-45	20-40	20-35	50-65	30-40
	41-60	Stratified gravelly sandy loam to very cobbly clay loam.	GC, SC	A-6	10-35	60-90	50-80	45-65	35-45	25-40	10-20
487*:											
Indian Creek Variant---------	0-3	Very gravelly loam.	GM-GC	A-2	0-5	50-60	30-50	20-35	20-30	25-35	5-10
	3-18	Very gravelly clay loam, very gravelly sandy clay loam.	GC	A-2	5-25	40-50	35-50	25-40	15-35	30-40	10-20
	18-39	Indurated---------	---	---	---	---	---	---	---	---	---
	39-60	Stratified very gravelly sand to loamy sand.	GP-GM, SP-SM	A-1	0-10	50-60	30-55	15-25	5-10	---	NP
Cassiro----------	0-6	Extremely stony loam.	SM-SC, GM-GC	A-4	25-50	60-80	50-70	45-60	35-45	20-30	5-10
	6-40	Extremely gravelly clay, very gravelly clay.	GC	A-2	10-20	30-50	25-45	20-40	20-35	50-65	30-40
	40-60	Stratified very gravelly sandy loam to very cobbly clay loam.	GC, SC	A-6	10-35	60-90	50-80	45-65	35-45	25-40	10-20
Puett------------	0-3	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	3-13	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
488*:											
Indian Creek Variant---------	0-3	Very stony loam	GM, GM-GC	A-2	20-30	50-60	40-50	35-45	25-35	20-30	NP-10
	3-15	Very gravelly clay loam, very gravelly sandy clay loam.	GC	A-2	5-25	40-50	35-50	25-40	15-35	30-40	10-20
	15-35	Indurated---------	---	---	---	---	---	---	---	---	---
	35-60	Stratified very gravelly sand to loamy sand.	GP-GM, SP-SM	A-1	0-10	50-60	30-55	15-25	5-10	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
488*:											
Roloc-----------	0-5	Stony sandy loam	SM	A-1	5-20	80-90	55-65	35-45	20-25	---	NP
	5-17	Very gravelly coarse sandy loam, very gravelly loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	10-30	20-30	5-10
	17	Weathered bedrock	---	---	---	---	---	---	---	---	---
491-------------- Indiano	0-13	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-31	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
501, 502--------- James Canyon	0-31	Loam-------------	CL, CL-ML	A-4, A-6	0-5	90-100	75-85	65-75	55-65	25-35	5-15
	31-60	Stratified gravelly loam to clay loam.	GC	A-6	0-5	65-75	60-70	55-65	40-50	30-35	10-15
503-------------- Kimmerling Variant	0-8	Peat-------------	Pt	A-8	---	---	---	---	---	---	---
	8-32	Loam-------------	CL	A-6	0	90-100	80-90	70-80	50-60	30-35	10-15
	32-60	Stratified gravelly loam to clay loam.	SC, GC, CL	A-6	0	70-85	65-80	55-75	40-65	30-40	10-20
511, 512--------- James Canyon Variant	0-15	Loam-------------	SC, CL	A-6	0	100	90-100	75-85	45-55	30-35	10-15
	15-36	Stratified sandy loam to sandy clay loam.	SC	A-6	0	90-100	80-90	65-75	35-50	30-35	10-15
	36-60	Stratified loamy sand to loamy coarse sand.	SM	A-1, A-2	0	90-100	75-85	40-60	15-30	---	NP
521-------------- Job	0-9	Loam-------------	CL	A-6	0	100	100	85-95	60-70	30-35	10-15
	9-25	Stratified fine sandy loam to very fine sandy loam.	CL-ML	A-4	0	100	100	75-85	50-60	20-25	5-10
	25-60	Stratified loam to clay loam.	CL	A-6	0	100	100	85-95	70-85	30-40	10-20
523-------------- Job	0-9	Loam-------------	CL	A-6	0	100	100	85-95	60-70	30-35	10-15
	9-25	Stratified fine sandy loam to very fine sandy loam.	CL-ML	A-4	0	100	100	75-85	50-60	20-25	5-10
	25-60	Stratified loam to clay loam.	CL	A-6	0	100	100	85-95	70-85	30-40	10-20
524-------------- Job	0-9	Loam-------------	CL	A-6	0	100	100	85-95	60-70	30-35	10-15
	9-25	Stratified very fine sandy loam to fine sandy loam.	CL-ML	A-4	0	100	100	75-85	50-60	20-25	5-10
	25-42	Stratified loam to clay loam.	CL	A-6	0	100	100	85-95	75-85	30-40	10-20
	42-60	Clay-------------	CH	A-7	0	100	100	90-100	75-85	55-65	30-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
531 Jubilee	0-5	Loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
	5-37	Stratified coarse sandy loam to fine sandy loam.	SM	A-2	0	95-100	85-100	55-60	25-35	15-25	NP-5
	37-60	Stratified coarse sand to sandy loam.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
532 Jubilee	0-10	Clay	CH	A-7	0	100	100	90-100	75-95	50-60	25-30
	10-35	Stratified coarse sandy loam to fine sandy loam.	SM	A-2	0	95-100	85-100	55-60	25-35	15-25	NP-5
	35-60	Stratified sandy loam to coarse sand.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
533 Jubilee Variant	0-6	Peat	Pt	A-8	0	---	---	---	---	---	---
	6-47	Stratified sandy loam to fine sandy loam.	SM	A-2, A-4	0	95-100	90-95	60-70	30-40	15-25	NP-5
	47-60	Stratified sandy loam to coarse sand.	SM	A-1	0	90-100	80-90	40-50	10-20	---	NP
534*:											
Jubilee	0-10	Loam	CL-ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	10-38	Stratified coarse sandy loam to fine sandy loam.	SM	A-2	0	95-100	85-100	55-60	25-35	15-25	NP-5
	38-60	Stratified sandy loam to coarse sand.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
Dressler	0-18	Sandy loam	SM	A-2	0-5	90-100	80-90	40-50	25-35	---	NP
	18-60	Stratified sand to cobbly coarse sandy loam.	SM, SP-SM	A-1	10-30	80-90	65-80	35-45	5-15	---	NP
Kimmerling	0-22	Loam	CL	A-6	0	100	100	90-100	70-90	30-40	10-20
	22-42	Stratified loam to silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
	42-60	Stratified gravelly loamy sand to silty clay loam.	SC, CL	A-6	0	75-100	70-100	50-90	40-65	30-40	10-20
541*:											
Softscrabble	0-14	Extremely cobbly loam.	GM-GC	A-2	30-50	40-50	35-45	25-40	20-35	20-30	5-10
	14-27	Extremely gravelly clay loam, very gravelly clay loam.	GC	A-2	10-25	35-60	30-55	25-45	20-35	35-45	15-20
	27-60	Very gravelly loam, very gravelly clay loam, extremely gravelly loam.	GC, GM	A-2	10-25	35-60	30-55	25-45	20-35	30-40	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
541*: Glean-----------	0-6	Extremely stony sandy loam.	GM, SM	A-2	35-50	55-75	50-70	40-60	25-35	20-30	NP-5
	6-39	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	39-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
Genoa-----------	0-4	Extremely stony fine sandy loam.	SM-SC	A-2	40-50	60-70	40-50	25-45	10-20	25-30	5-10
	4-18	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	SC	A-2	50-65	75-90	55-75	25-60	20-50	30-40	10-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
552-------------- Kimmerling	0-26	Loam-------------	CL	A-6	0	100	90-100	80-90	60-70	30-35	10-15
	26-38	Stratified fine sandy loam to clay loam.	CL	A-6	0	100	90-100	80-90	65-80	30-40	10-20
	38-60	Cobbly sandy loam	SM	A-1	15-20	70-85	65-80	35-50	15-25	---	NP
553-------------- Kimmerling	0-8	Clay loam--------	CL	A-6	0	100	100	90-100	70-90	30-40	10-20
	8-48	Stratified loam to silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
	48-60	Stratified gravelly loamy sand to silty clay loam.	SC, CL	A-6	0	75-100	70-100	50-90	40-65	30-40	10-20
555-------------- Kimmerling	0-8	Clay loam--------	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
	8-42	Stratified loam to silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
	42-60	Clay-------------	CH	A-7	0	100	100	100	80-90	50-60	30-40
561*: Koontz----------	0-5	Very gravelly loam.	GM	A-2	0-15	50-65	35-50	30-45	25-35	20-30	NP-5
	5-12	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	30-45	25-40	30-40	10-20
	12	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sutro-----------	0-10	Very stony loam	GC	A-2, A-6	20-30	55-65	45-55	35-45	30-40	30-35	10-15
	10-39	Gravelly loam----	SC	A-6	5-20	70-80	55-65	45-55	35-45	30-35	10-15
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
562*: Koontz----------	0-3	Extremely stony loam.	SM	A-4	30-45	75-85	65-80	45-60	35-50	20-30	NP-5
	3-14	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	25-45	25-40	30-40	10-20
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
562*:											
Sutro	0-10	Very stony loam	GC	A-2, A-6	20-30	55-65	45-55	35-45	30-40	30-35	10-15
	10-39	Gravelly loam, gravelly sandy loam.	SC	A-6	5-20	70-80	55-65	45-55	35-45	30-35	10-15
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
571*:											
Kram	0-3	Very gravelly very fine sandy loam.	GM	A-1, A-2	10-15	50-60	35-50	30-50	20-30	15-25	NP-5
	3-10	Very gravelly loam, very gravelly very fine sandy loam.	GM	A-1, A-2	10-15	40-60	30-55	25-45	20-30	15-25	NP-5
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Puett Variant	0-8	Very gravelly loam.	GM, SM	A-2	0-10	60-70	40-50	40-50	25-35	20-25	NP-5
	8-28	Very gravelly fine sandy loam.	GM	A-1	0-10	40-50	30-40	20-30	15-20	20-25	NP-5
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
581*:											
Loomer	0-3	Extremely cobbly loam.	GM-GC	A-2	65-75	30-40	15-25	10-20	10-20	25-30	5-10
	3-17	Extremely gravelly clay.	GC	A-2	30-40	30-45	20-35	15-30	15-25	50-60	25-35
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Loomer	0-4	Extremely cobbly loam.	GM-GC	A-2	65-75	30-40	15-25	10-20	10-20	25-30	5-10
	4-19	Extremely gravelly clay.	GC	A-2	30-40	30-45	20-35	15-30	15-25	50-60	25-35
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
582*:											
Loomer	0-2	Extremely cobbly loam.	GM-GC	A-2	65-75	30-40	15-25	10-20	10-20	25-30	5-10
	2-17	Extremely gravelly clay.	GC	A-2	30-40	30-45	20-35	15-30	15-25	50-60	25-35
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Olac	0-3	Very stony loam	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	35-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
583*:											
Loomer	0-4	Extremely cobbly loam.	GM-GC	A-2	65-75	30-40	15-25	10-20	10-20	25-30	5-10
	4-15	Extremely gravelly clay.	GC	A-2	30-40	30-45	20-35	15-30	15-25	50-60	25-35
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
583*:											
Zephan----------	0-2	Extremely cobbly loam.	GM	A-1, A-2	40-45	30-60	20-50	15-40	10-30	20-25	NP-5
	2-37	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
Olac------------	0-4	Extremely stony loam.	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	4-14	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	35-40	15-20
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
591*:											
Minneha---------	0-7	Very gravelly sandy loam.	SM	A-1	15-25	80-90	35-55	25-40	10-20	15-25	NP-5
	7-18	Very gravelly sandy loam.	SM	A-1	5-10	80-90	30-55	20-30	10-15	15-25	NP-5
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit------------	0-15	Very stony sandy loam.	SM	A-1	20-45	60-75	45-55	25-40	10-25	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly coarse sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10
Glean-----------	0-8	Very gravelly sandy loam.	GM	A-1, A-2	0-10	30-55	25-50	20-40	10-30	20-30	NP-5
	8-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	10-35	20-30	NP-5
	30-60	Very cobbly sandy loam, very cobbly loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
592*:											
Minneha---------	0-8	Extremely stony sandy loam.	SM	A-1	40-50	70-80	45-55	25-35	15-25	15-25	NP-5
	8-15	Very gravelly sandy loam.	SM	A-1	5-10	80-90	30-55	20-30	10-15	15-25	NP-5
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit------------	0-15	Extremely stony sandy loam.	SM	A-1	20-45	60-75	45-55	25-40	10-25	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
592*: Rock outcrop.											
601 Mottsville	0-24	Loamy coarse sand	SP-SM, SM	A-1	0	80-100	75-90	25-40	5-20	---	NP
	24-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
602 Mottsville	0-18	Gravelly loamy coarse sand.	SP-SM, SM	A-1	0	80-100	55-75	20-35	5-15	---	NP
	18-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
603 Mottsville	0-24	Very bouldery loamy coarse sand.	SP-SM, SM	A-1	15-25	80-90	60-70	40-50	5-15	---	NP
	24-60	Gravelly loamy coarse sand.	SP-SM	A-1	0-5	70-80	50-60	30-40	5-10	---	NP
604*: Mottsville	0-12	Loamy coarse sand	SP-SM, SM	A-1	0	80-100	75-90	25-40	5-20	---	NP
	12-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
Drit	0-15	Very stony sandy loam.	SM	A-1	20-45	60-75	45-55	25-40	10-25	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly coarse sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10
Roloc	0-6	Very gravelly sandy loam.	SM	A-1	5-15	80-90	40-55	25-35	10-20	---	NP
	6-15	Very gravelly coarse sandy loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	15-30	20-30	5-10
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
611 Nevador	0-9	Fine sandy loam	SM	A-4	0-5	90-100	80-90	65-75	35-45	20-25	NP-5
	9-24	Clay loam, sandy clay loam.	SC, CL	A-7, A-6	0-5	90-100	80-90	70-80	45-55	35-45	15-25
	24-60	Stratified fine sandy loam to loamy sand.	SM	A-2, A-4	0-10	90-100	80-90	50-60	30-40	20-25	NP-5
612 Nevador	0-4	Fine sandy loam	SM	A-4	0-5	90-100	80-90	65-75	35-45	20-25	NP-5
	4-24	Clay loam, sandy clay loam.	SC, CL	A-7, A-6	0-5	90-100	80-90	70-80	45-55	35-45	15-25
	24-60	Fine sandy loam.	SM	A-2, A-4	0-10	90-100	80-90	50-60	30-40	20-25	NP-5
621 Niwot	0-15	Loam	CL	A-6	0	100	90-100	80-90	45-60	30-35	10-15
	15-60	Stratified sand to gravelly sand.	SP	A-1, A-3	0	90-100	65-75	45-55	0-5	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
622------------- Niwot	0-12	Clay loam--------	CL	A-6	0	100	90-100	80-90	55-65	35-40	15-20
	12-40	Stratified sand to gravelly sand.	SP	A-1, A-3, A-2	0	90-100	65-75	45-55	0-5	---	NP
	40-60	Clay--------------	CH	A-7	0	100	100	90-100	80-90	50-60	25-35
631*: Olac------------	0-3	Very stony loam	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	35-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ister------------	0-17	Extremely stony sandy loam.	GM, SM	A-1, A-2	30-40	45-70	40-65	30-45	15-35	20-30	NP-5
	17-38	Very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	15-20
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
641------------- Ophir	0-10	Gravelly sandy loam.	SM	A-1, A-2	0	85-95	60-75	40-55	15-35	---	NP
	10-60	Stratified gravelly coarse sand to sandy loam.	SM	A-1, A-2	0	85-100	60-90	35-55	10-25	---	NP
642------------- Ophir	0-10	Gravelly sandy loam.	SM	A-1, A-2	0	85-95	60-75	40-55	15-35	---	NP
	10-60	Stratified gravelly coarse sand to sandy loam.	SM	A-1, A-2	0	85-100	60-90	35-55	10-25	---	NP
644------------- Ophir Variant	0-7	Peat---------------	Pt	A-8	0	---	---	---	---	---	---
	7-17	Gravelly sandy loam, loamy sand.	SM	A-1, A-2	0	80-90	70-80	40-55	15-25	---	NP
	17-60	Stratified gravelly coarse sand to sandy loam.	SM, SP-SM	A-1	0	80-90	60-80	35-50	5-15	---	NP
651*: Oppio-----------	0-5	Very stony fine sandy loam.	SM	A-1, A-2	25-35	65-75	45-65	35-50	20-30	10-20	NP-5
	5-30	Gravelly clay----	GC	A-6, A-7	0-5	60-70	50-60	45-55	40-50	35-45	20-30
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nosrac-----------	0-8	Stony clay loam	GC	A-6	5-20	60-70	55-65	50-60	40-50	30-35	10-15
	8-35	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	35-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
661------------- Ormsby	0-16	Loamy sand-------	SM	A-2	0	90-100	75-90	50-60	15-25	---	NP
	16-60	Gravelly coarse sand.	SP-SM	A-1	0	85-95	55-70	25-40	5-10	---	NP
662------------- Ormsby	0-16	Gravelly loamy coarse sand.	SP-SM, SM	A-1	0	85-95	55-65	30-45	5-15	---	NP
	16-60	Gravelly coarse sand.	SP-SM	A-1	0	85-95	55-70	25-40	5-10	---	NP
671*: Pernty----------	0-5	Very gravelly loam.	GC	A-2	0-10	40-55	35-50	25-35	20-30	30-35	10-15
	5-15	Very cobbly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-6, A-7	10-30	50-60	45-55	40-50	35-45	35-45	15-20
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough Variant---------	0-19	Stony loam--------	CL-ML	A-4	5-10	75-90	70-85	60-80	50-60	20-30	5-10
	19-35	Gravelly clay loam, gravelly loam.	CL, GC	A-6, A-7	0-10	60-80	55-75	50-70	35-55	35-45	15-25
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chen------------	0-5	Very cobbly loam	GC	A-2	45-55	45-55	30-40	25-35	20-30	25-35	10-15
	5-14	Very gravelly clay, extremely gravelly clay.	GC	A-2	5-15	35-55	15-40	15-40	10-35	55-65	35-40
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
672*: Pernty----------	0-2	Very stony loam	GC	A-2	20-30	50-60	45-55	35-45	25-35	30-35	10-15
	2-19	Very cobbly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-6, A-7	10-30	50-60	45-55	40-50	35-45	35-45	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough-----	0-10	Stony loam--------	CL, CL-ML	A-4, A-6	5-15	85-95	70-85	60-75	50-60	20-35	5-15
	10-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Glean-----------	0-2	Very stony loam	GM, SM	A-2	20-35	55-70	50-65	40-55	25-35	20-30	NP-5
	2-23	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	23-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
673*:											
Pernty----------	0-4	Very stony loam	GC	A-2	20-30	50-60	45-55	35-45	25-35	30-35	10-15
	4-19	Very cobbly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-6, A-7	10-30	50-60	45-55	40-50	35-45	35-45	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough-----	0-7	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	7-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Rock outcrop.											
681-------------- Phing	0-2	Sandy loam--------	SM-SC	A-1, A-2	0-5	90-100	85-90	50-60	25-35	20-25	5-10
	2-27	Clay--------------	CH	A-7	0-10	95-100	85-95	80-85	70-80	60-75	35-50
	27-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0-10	80-100	75-90	70-80	60-80	35-55	15-30
682-------------- Phing	0-9	Cobbly sandy loam	SM-SC, SC	A-2	25-35	75-85	65-75	45-55	25-35	20-30	5-15
	9-31	Clay--------------	CH	A-7	0-5	100	90-100	80-90	70-80	60-75	35-50
	31-60	Loam, silty clay loam, clay.	CH, CL	A-7, A-6	0-5	80-100	75-95	75-85	65-80	30-55	15-30
683-------------- Phing	0-4	Gravelly loam----	SC, SM-SC	A-6, A-4	5-10	75-80	65-75	50-60	40-50	25-35	5-15
	4-38	Clay--------------	CH	A-7	0-10	95-100	85-95	80-85	70-80	60-75	35-50
	38-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0-10	80-100	75-90	70-80	60-80	35-55	15-30
685*:											
Phing-----------	0-4	Very gravelly loam.	GM, GM-GC, SM, SM-SC	A-2	5-10	50-60	45-55	30-40	20-30	25-35	5-15
	4-28	Clay--------------	CH	A-7	0-10	95-100	85-95	80-85	70-80	60-75	35-50
	28-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0-10	80-100	75-90	70-80	60-80	35-55	15-30
Chalco----------	0-4	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	75-85	65-75	50-60	30-45	20-25	NP-5
	4-17	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-60	30-40
	17	Weathered bedrock	---	---	---	---	---	---	---	---	---
Uhaldi----------	0-8	Stony loam--------	GC, SC	A-6	5-15	65-75	55-65	50-60	35-45	30-35	10-15
	8-35	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
691-------------- Updike Variant	0-4	Loam--------------	CL-ML, CL	A-4, A-6	0	100	100	80-90	60-70	25-35	5-15
	4-41	Clay loam, loam	CL	A-6, A-7	0	100	100	85-90	60-75	35-45	15-20
	41-60	Loam, fine sandy loam.	CL-ML	A-4	0	100	100	70-85	50-65	25-30	5-10
693*:											
Updike Variant--	0-6	Sandy loam--------	SM	A-1, A-2	0	100	100	60-75	15-35	---	NP
	6-19	Clay loam, loam	CL	A-6, A-7	0	100	100	85-90	60-75	35-45	15-20
	19-60	Loam, fine sandy loam.	CL-ML	A-4	0	100	100	70-85	50-65	25-30	5-10
Playas.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
702 Perazzo	0-4	Gravelly loam	GM-GC, SM-SC	A-2, A-4	0-5	55-70	50-65	45-60	30-45	20-30	5-10
	4-15	Very gravelly sandy clay loam, very gravelly clay loam.	GC	A-2	0-5	40-60	35-50	30-40	20-35	30-40	10-15
	15-32	Extremely gravelly sandy loam, extremely gravelly loam.	GP-GM, GM	A-1	0-5	20-30	15-25	10-20	5-15	---	NP
	32-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP-GM, GP	A-1	0-5	20-30	15-25	10-20	0-10	---	NP
712 Prey	0-13	Gravelly loamy sand.	SM	A-1	0	60-85	50-75	35-50	10-20	---	NP
	13-30	Sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0	80-95	60-90	35-50	20-30	15-25	NP-5
	30-35	Cemented	---	---	---	---	---	---	---	---	---
	35-60	Loamy coarse sand	SM	A-1	0	75-90	75-85	30-40	10-15	---	NP
713 Prey	0-9	Stony sandy loam	SM	A-2	10-15	85-95	75-85	45-55	25-35	20-25	NP-5
	9-30	Gravelly coarse sandy loam.	SM-SC	A-2	0	80-95	60-75	35-50	20-30	25-30	5-10
	30-35	Cemented	---	---	---	---	---	---	---	---	---
	35-60	Stratified loamy coarse sand to very gravelly loamy sand.	SM	A-1	0	75-85	45-60	30-45	10-15	---	NP
721 Prey Variant	0-10	Stony loam	SM-SC	A-4	10-20	70-75	55-65	45-55	35-45	20-25	5-10
	10-15	Gravelly sandy loam, gravelly loam, gravelly sandy clay loam.	SC	A-6	0-5	80-85	60-80	50-65	40-50	30-35	10-15
	15-22	Indurated	---	---	---	---	---	---	---	---	---
	22-60	Very gravelly fine sandy loam, very gravelly sandy loam.	SM	A-1, A-2	10-15	70-80	45-55	35-45	20-30	---	NP
731 Job Variant	0-7	Silt loam	ML	A-4	0	100	100	95-100	75-90	20-25	NP-5
	7-60	Silt loam	ML	A-4	0	100	100	95-100	75-90	20-25	NP-5
741*:											
Puett	0-3	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	3-10	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chalco	0-3	Very cobbly loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	3-13	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chalco	0-4	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	75-85	65-75	50-60	30-45	20-25	NP-5
	4-16	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-60	30-40
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
742*: Puett	0-3	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	3-10	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chalco	0-4	Very cobbly loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	4-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pula	0-2	Very gravelly loam.	GC	A-2, A-6	0-25	35-60	30-55	25-45	20-40	30-35	10-15
	2-32	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	32-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15
743*: Puett	0-3	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	3-18	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Verdico	0-4	Very gravelly loam.	GC	A-2	0-5	50-60	40-50	40-45	30-35	30-35	10-15
	4-21	Clay	CH	A-7	0-5	95-100	85-95	80-90	70-85	50-65	35-40
	21-35	Gravelly clay	CH	A-7	0-5	75-85	60-75	60-70	50-70	50-65	35-40
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Haybourne	0-6	Loam	ML	A-4	0	95-100	85-95	80-90	50-60	20-30	NP-5
	6-31	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	31-60	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
744*: Puett	0-2	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	2-16	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Verdico	0-3	Very gravelly loam.	GC	A-2	0-5	50-60	40-50	40-45	30-35	30-35	10-15
	3-30	Clay	CH	A-7	0-5	95-100	85-95	80-90	70-85	50-65	35-40
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
744*:											
Uhaldi	0-8	Stony loam	GC, SC	A-6	5-15	65-75	55-65	50-60	35-45	30-35	10-15
	8-30	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
751*:											
Pula	0-4	Very stony loam	GC	A-2, A-6	25-50	50-75	45-70	40-60	30-50	30-35	10-15
	4-24	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	24-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15
Cassiro	0-8	Stony loam	SM-SC	A-4	15-25	80-95	65-75	60-70	40-50	20-30	5-10
	8-42	Extremely gravelly clay, very gravelly clay.	GC	A-2	10-20	30-50	25-45	20-40	20-35	50-65	30-40
	42-60	Stratified gravelly sandy loam to very cobbly clay loam.	GC, SC	A-6	10-35	60-90	50-80	45-65	35-45	25-40	10-20
752*:											
Pula	0-4	Very stony loam	GC	A-2, A-6	25-50	50-75	45-70	40-60	30-50	30-35	10-15
	4-24	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	24-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15
Chalco	0-4	Very stony loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	4-16	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pung	0-6	Stony loam	GC, SC	A-6	10-15	55-80	55-75	40-65	35-50	30-35	10-15
	6-30	Clay	CH	A-7	0-5	90-100	80-90	75-85	65-80	55-70	35-50
	30-60	Loam, sandy loam	SM-SC	A-2, A-4	0-5	90-100	80-90	55-75	30-50	20-30	5-10
753*:											
Pula	0-5	Very stony loam	GC	A-2, A-6	25-50	50-75	45-70	40-60	30-50	30-35	10-15
	5-30	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	30-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
753*:											
Nosrac----------	0-9	Stony fine sandy loam.	SM-SC	A-2	5-20	60-70	55-65	45-55	15-25	20-25	5-10
	9-40	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	40-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
Pung------------	0-8	Stony loam-------	GC, SC	A-6	10-15	55-80	55-75	40-65	35-50	30-35	10-15
	8-32	Clay-------------	CH	A-7	0-5	90-100	80-90	75-85	65-80	55-70	35-50
	32-60	Loam, sandy loam	SM-SC	A-2, A-4	0-5	90-100	80-90	55-75	30-50	20-30	5-10
762*:											
Pulcan----------	0-5	Very gravelly fine sandy loam.	GM-GC	A-2	10-25	40-50	35-45	15-35	10-25	20-30	5-10
	5-25	Very gravelly clay, very gravelly sandy clay, very gravelly clay loam.	GC	A-2	10-25	30-60	25-55	15-35	10-30	50-60	30-35
	25-34	Very gravelly sandy loam, very gravelly loamy sand.	GM-GC, GP-GM, GM	A-2, A-1	5-15	30-55	25-55	10-30	5-20	20-30	NP-10
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
Puett-----------	0-3	Gravelly fine sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	3-16	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Uhaldi----------	0-4	Stony loam-------	GC, SC	A-6	5-15	65-75	55-65	50-60	35-45	30-35	10-15
	4-25	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	25	Weathered bedrock	---	---	---	---	---	---	---	---	---
771------------- Rawe	0-5	Gravelly sandy loam.	SM	A-1, A-2	0	70-90	60-75	35-50	20-35	15-25	NP-5
	5-23	Gravelly clay loam, gravelly clay.	SC, CL	A-7	0	75-90	50-75	40-65	35-60	40-50	15-25
	23-60	Extremely gravelly coarse sandy loam, very gravelly sandy loam, very gravelly coarse sandy loam.	GP, GP-GM, GM	A-1, A-2	0	45-60	10-50	5-35	0-20	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
772------------- Rawe	0-3	Gravelly fine sandy loam.	SM	A-1, A-2	0	70-90	60-75	35-50	20-35	15-25	NP-5
	3-23	Gravelly clay loam, gravelly clay.	SC, CL	A-7	0	75-90	50-75	40-65	35-60	40-50	15-25
	23-60	Extremely gravelly coarse sandy loam, very gravelly sandy loam, very gravelly coarse sandy loam.	GP, GP-GM, GM	A-1, A-2	0	45-60	10-50	5-35	0-20	---	NP
781------------- Reno	0-3	Gravelly sandy loam.	SM, GM	A-1, A-2	0-5	60-75	50-75	35-50	20-30	15-25	NP-5
	3-24	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	24-32	Very gravelly coarse sand.	GP	A-1	0-5	40-50	35-50	15-25	0-5	---	NP
	32-44	Indurated---------	---	---	---	---	---	---	---	---	---
	44-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
782------------- Reno	0-6	Gravelly sandy loam.	SM, GM	A-1, A-2	0-5	60-75	50-75	35-50	20-30	15-25	NP-5
	6-24	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	24-34	Indurated---------	---	---	---	---	---	---	---	---	---
	34-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
783------------- Reno	0-2	Very cobbly loam	GC	A-2, A-6	25-35	50-70	40-60	35-55	30-40	30-35	10-15
	2-29	Clay-------------	CL, CH	A-7	0-5	95-100	85-95	80-90	70-85	45-60	25-35
	29-39	Indurated---------	---	---	---	---	---	---	---	---	---
	39-60	Very gravelly sand.	SM, GM, GP-GM, SP-SM	A-1	5-10	50-75	30-55	20-40	5-15	---	NP
784------------- Reno	0-3	Gravelly clay loam.	SC, CL, GC	A-6	0	65-75	60-75	55-70	45-55	35-40	15-20
	3-22	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	22-32	Indurated---------	---	---	---	---	---	---	---	---	---
	32-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
785*: Phing Variant---	0-5	Extremely gravelly sandy loam.	GP-GM	A-1	5-10	35-50	15-20	10-20	5-10	---	NP
	5-27	Clay-------------	CH	A-7	0-5	95-100	85-95	80-90	70-85	60-75	35-50
	27	Indurated---------	---	---	---	---	---	---	---	---	---
Reno------------	0-4	Cobbly fine sandy loam.	SM	A-2	15-30	75-95	70-90	50-70	25-35	15-25	NP-5
	4-21	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	21-28	Very gravelly coarse sand.	GP	A-1	0-5	40-50	35-50	15-25	0-5	---	NP
	28-35	Indurated---------	---	---	---	---	---	---	---	---	---
	35-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
786*:											
Reno	0-2	Very cobbly loam	GC	A-2, A-6	25-35	50-70	40-60	35-55	30-40	30-35	10-15
	2-29	Clay	CL, CH	A-7	0-5	95-100	85-95	80-90	70-85	45-60	25-35
	29-41	Indurated	---	---	---	---	---	---	---	---	---
	41-60	Very gravelly sand.	SM, GM, GP-GM, SP-SM	A-1	5-10	50-75	30-55	20-40	5-15	---	NP
Phing	0-6	Very gravelly loam.	GM, GM-GC, SM, SM-SC	A-2	5-10	50-60	45-55	30-40	20-30	25-35	5-15
	6-34	Clay	CH	A-7	0-10	95-100	85-95	80-85	70-80	60-75	35-50
	34-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0-10	80-100	75-90	70-80	60-80	35-55	15-30
Springmeyer	0-10	Gravelly fine sandy loam.	SC	A-2, A-6	0-5	65-80	55-75	45-60	25-40	25-35	10-15
	10-22	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	22-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
787*:											
Reno	0-4	Cobbly fine sandy loam.	SM	A-2	15-30	75-95	70-90	50-70	25-35	15-25	NP-5
	4-36	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	36-60	Indurated	---	---	---	---	---	---	---	---	---
Saralegui	0-7	Coarse sand	SP-SM	A-1	0-5	95-100	85-95	40-50	5-10	---	NP
	7-31	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM-SC	A-2	0-5	90-100	65-90	50-60	20-30	25-30	5-10
	31-60	Gravelly sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	95-100	65-95	45-55	10-20	---	NP
788*:											
Reno	0-4	Cobbly fine sandy loam.	SM	A-2	15-30	75-95	70-90	50-70	25-35	15-25	NP-5
	4-32	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	32-36	Indurated	---	---	---	---	---	---	---	---	---
	36-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
Stucky	0-5	Very cobbly loam	GM	A-2, A-4	25-40	50-70	45-65	35-55	25-45	15-25	NP-5
	5-30	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	GC	A-2	35-75	45-60	35-50	30-45	15-30	30-40	15-20
	30-60	Stratified extremely cobbly sandy loam to very stony clay loam.	GC, GM-GC	A-2	35-50	45-60	35-50	25-45	15-35	20-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
789*:											
Phing Variant---	0-2	Extremely gravelly sandy loam.	GP-GM	A-1	5-10	35-50	15-20	10-20	5-10	---	NP
	2-27	Clay-------------	CH	A-7	0-5	95-100	85-95	80-90	70-85	60-75	35-50
	27	Indurated--------	---	---	---	---	---	---	---	---	---
Zephan----------	0-5	Stony sandy loam	SM-SC	A-2	5-10	65-80	55-65	35-45	15-25	20-30	5-10
	5-26	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
791-------------- Risue	0-5	Gravelly loam----	GM-GC, SM-SC	A-4	5-15	65-80	60-75	45-60	35-50	25-30	5-10
	5-18	Clay, clay loam, gravelly clay.	CL, CH	A-7	0-5	75-100	70-100	60-90	50-70	45-60	20-35
	18-60	Indurated--------	---	---	---	---	---	---	---	---	---
792-------------- Risue	0-3	Very gravelly loam.	GM-GC	A-2	10-25	40-55	35-50	30-45	20-35	25-30	5-10
	3-14	Clay, clay loam, gravelly clay.	CL, CH	A-7	0-5	75-100	70-100	60-90	50-70	45-60	20-35
	14-60	Indurated--------	---	---	---	---	---	---	---	---	---
801*. Riverwash											
811*. Rock outcrop											
821*:											
Roloc-----------	0-6	Very gravelly sandy loam.	SM	A-1	5-15	80-90	40-55	25-35	10-20	---	NP
	6-15	Very gravelly coarse sandy loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	15-30	20-30	5-10
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit------------	0-15	Stony sandy loam	SM	A-1, A-2	5-15	80-90	70-80	40-60	20-35	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly fine sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10
831-------------- Saralegui	0-11	Sand-------------	SP-SM, SM	A-1, A-2, A-3	0	95-100	85-95	45-55	5-15	---	NP
	11-28	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM-SC	A-2	0-5	90-100	65-90	50-60	20-30	25-30	5-10
	28-60	Gravelly sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	95-100	65-95	45-55	10-20	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
832-------------- Saralegui	0-11	Sand--------------	SP-SM, SM	A-1, A-2, A-3	0	95-100	85-95	45-55	5-15	---	NP
	11-28	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM-SC	A-2	0-5	90-100	65-90	50-60	20-30	25-30	5-10
	28-60	Sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	95-100	75-95	45-55	10-20	---	NP
833*: Saralegui-------	0-6	Coarse sand------	SP-SM	A-1	0-5	95-100	85-95	40-50	5-10	---	NP
	6-29	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM-SC	A-2	0-5	90-100	65-90	50-60	20-30	25-30	5-10
	29-60	Sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	95-100	75-95	45-55	10-20	---	NP
Saralegui-------	0-3	Sandy loam-------	SM	A-2	0	95-100	85-95	55-65	25-35	---	NP
	3-27	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM-SC	A-2	0-5	90-100	65-90	50-60	20-30	25-30	5-10
	27-60	Sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	95-100	75-95	45-55	10-20	---	NP
834*: Saralegui-------	0-6	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-80	60-75	35-50	15-30	---	NP
	6-30	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-80	60-75	35-50	15-30	20-30	NP-5
	30-60	Gravelly sandy loam, loamy sand, sand.	SM	A-1, A-2	0-5	80-95	65-90	45-65	10-35	---	NP
Haybourne-------	0-12	Gravelly sandy loam.	SM	A-1, A-2	0	80-90	65-75	40-50	20-35	---	NP
	12-22	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	22-60	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
Reno------------	0-3	Stony loam-------	GC	A-6	15-25	65-75	60-70	55-65	40-50	30-35	10-15
	3-35	Clay-------------	CL, CH	A-7	0-5	95-100	85-95	80-90	70-85	45-60	25-35
	35-43	Indurated--------	---	---	---	---	---	---	---	---	---
	43-60	Very gravelly sand.	SM, GM, GP-GM, SP-SM	A-1	5-10	50-75	30-55	20-40	5-15	---	NP
841*: Searles---------	0-14	Very stony loam	SC	A-6	25-45	80-90	60-75	55-65	40-50	25-30	10-15
	14-31	Extremely gravelly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-2	0-15	45-55	25-35	20-35	15-30	35-45	15-20
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
841*:											
Devada----------	0-4	Very cobbly loam	GM-GC, GC	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-45	25-35	5-10
	4-14	Clay, gravelly clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco------------	0-6	Very cobbly fine sandy loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	6-18	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
842*:											
Searles---------	0-6	Very stony loam	SC	A-6	25-45	80-90	60-75	55-65	40-50	25-30	10-15
	6-36	Extremely gravelly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-2	0-15	45-55	25-35	20-35	15-30	35-45	15-20
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough-----	0-9	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	9-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Duco------------	0-4	Extremely stony loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	4-18	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
843*:											
Searles---------	0-6	Very stony loam	SC	A-6	25-45	80-90	60-75	55-65	40-50	25-30	10-15
	6-27	Extremely gravelly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-2	0-15	45-55	25-35	20-35	15-30	35-45	15-20
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough-----	0-14	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	14-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
843*: Chen	0-7	Very cobbly loam	GC	A-2	45-55	45-55	30-40	25-35	20-30	25-35	10-15
	7-18	Very gravelly clay.	GC	A-2	5-15	45-55	30-40	30-40	25-35	55-65	35-40
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
851, 852 Settlemeyer	0-15	Clay loam	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	15-35	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	35-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
854 Settlemeyer	0-12	Loam	CL-ML, CL	A-4, A-6	0	100	100	80-100	70-80	25-35	5-15
	12-30	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	30-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
861 Shakespeare	0-6	Gravelly loam	GM-GC	A-2, A-4	0-5	60-70	50-60	40-50	30-40	20-25	5-10
	6-37	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-15	50-60	40-50	30-40	20-30	30-40	15-20
	37-60	Stratified very gravelly fine sandy loam to silty clay loam.	SC	A-6	0-10	80-100	60-70	50-60	40-50	30-35	10-15
871 Shree	0-10	Very gravelly loam.	GM-GC, GC	A-2	0-5	40-60	35-50	30-50	20-35	25-35	5-15
	10-26	Very gravelly sandy clay loam, very gravelly clay loam, extremely gravelly sandy clay loam.	GC	A-2	5-10	45-55	25-40	20-30	10-25	35-45	15-20
	26-60	Very gravelly sandy loam, extremely gravelly loam, very gravelly fine sandy loam.	GC, GM-GC	A-2	0-15	45-55	25-40	15-25	10-15	20-35	5-15
872 Shree	0-8	Very stony loam	SM-SC, SC	A-2	15-30	70-80	60-70	40-50	20-35	25-35	5-15
	8-36	Very gravelly sandy clay loam, very gravelly clay loam, extremely gravelly sandy clay loam.	GC	A-2	5-10	45-55	25-40	20-30	10-25	35-45	15-20
	36-60	Very gravelly sandy loam, extremely gravelly loam, very gravelly fine sandy loam.	GC, GM-GC	A-2	0-15	45-55	25-40	15-25	10-15	20-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
873*:											
Shree	0-7	Very gravelly fine sandy loam.	GM-GC, GC	A-2	0-5	40-60	35-50	30-50	20-35	25-35	5-15
	7-26	Very gravelly sandy clay loam, very gravelly clay loam, extremely gravelly sandy clay loam.	GC	A-2	5-10	45-55	25-40	20-30	10-25	35-45	15-20
	26-60	Very gravelly loam, extremely gravelly sandy loam, very gravelly fine sandy loam.	GC, GM-GC	A-2	0-15	45-55	25-40	15-25	10-15	20-35	5-15
Settlemeyer	0-12	Loam	CL-ML, CL	A-4, A-6	0	100	100	80-100	70-80	25-35	5-15
	12-38	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	38-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
874*:											
Shree	0-6	Very stony loam	SM-SC, SC	A-2	15-30	70-80	60-70	40-50	20-35	25-35	5-15
	6-31	Very gravelly sandy clay loam, very gravelly clay loam, extremely gravelly sandy clay loam.	GC	A-2	5-10	45-55	25-40	20-30	10-25	35-45	15-20
	31-60	Very gravelly sandy loam, extremely gravelly loam, very gravelly fine sandy loam.	GC, GM-GC	A-2	0-15	45-55	25-40	15-25	10-15	20-35	5-15
Pung	0-6	Stony loam	GC, SC	A-6	10-15	55-80	55-75	40-65	35-50	30-35	10-15
	6-30	Clay	CH	A-7	0-5	90-100	80-90	75-85	65-80	55-70	35-50
	30-60	Loam, sandy loam	SM-SC	A-2, A-4	0-5	90-100	80-90	55-75	30-50	20-30	5-10
881 Springmeyer	0-10	Gravelly fine sandy loam.	SC	A-2, A-6	0-5	65-80	55-75	45-60	25-40	25-35	10-15
	10-22	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	22-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
882 Springmeyer	0-10	Stony fine sandy loam.	SC, CL, SM-SC, CL-ML	A-6, A-4	5-10	80-100	75-95	55-75	35-60	25-35	5-15
	10-22	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	22-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-10	70-85	55-70	35-50	25-35	30-40	10-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
883---------------- Springmeyer	0-10	Very stony fine sandy loam.	SM-SC	A-2	10-35	75-95	70-90	60-75	20-30	20-25	5-10
	10-22	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	22-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-10	70-85	55-70	35-50	25-35	30-40	10-15
884---------------- Springmeyer	0-10	Gravelly loam----	SC	A-2, A-6	0-5	65-80	55-75	45-60	25-40	25-35	10-15
	10-28	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	28-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
891---------------- Stodick	0-3	Very stony fine sandy loam.	SM	A-2, A-4	5-10	85-95	80-90	55-70	30-45	15-20	NP-5
	3-18	Very gravelly clay loam, very gravelly loam.	GC, SC	A-2, A-6	0-15	50-75	35-55	30-55	20-45	30-40	10-20
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
892*: Stodick----------	0-2	Stony fine sandy loam.	CL-ML, SM-SC	A-4	0-5	85-95	80-90	70-85	40-70	15-25	5-10
	2-16	Very gravelly clay loam, very gravelly loam.	GC, SC	A-2, A-6	0-15	50-75	35-55	30-55	20-45	30-40	10-20
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Indiano----------	0-10	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	10-34	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
901*: Surgem-----------	0-8	Extremely stony sandy loam.	GM	A-1	40-50	40-50	30-40	20-30	10-20	20-25	NP-5
	8-24	Very cobbly clay, very cobbly sandy clay, very gravelly clay.	CL, CH, GC, SC	A-7, A-2	25-60	65-100	50-85	30-75	20-65	40-55	20-30
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Olac-------------	0-2	Very stony loam	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	2-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	35-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
901*:											
Cagle----------	0-4	Very stony loam	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	4-28	Gravelly clay, gravelly clay loam.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-60	45-55	20-30
	28-36	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
911*:											
Theon-----------	0-2	Very gravelly loam.	GM-GC, GM	A-1, A-2	5-10	40-60	30-50	20-45	15-35	20-30	NP-10
	2-13	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-2	5-15	40-60	30-50	25-40	15-30	30-40	10-20
	13-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
912*:											
Theon-----------	0-2	Very gravelly loam.	GM-GC, GM	A-1, A-2	5-10	40-60	30-50	20-45	15-35	20-30	NP-10
	2-13	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-2	5-15	40-60	30-50	25-40	15-30	30-40	10-20
	13-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
921-------------- Nevador Variant	0-8	Fine sandy loam	CL-ML, SM-SC	A-4	0-5	80-95	75-90	60-70	35-60	20-30	5-10
	8-22	Gravelly loam, gravelly clay loam.	GC, SC	A-6, A-7	0-10	60-80	55-75	45-60	35-50	30-45	10-20
	22	Indurated--------	---	---	---	---	---	---	---	---	---
922-------------- Nevador Variant	0-8	Loam-------------	CL-ML, SM-SC	A-4	0-5	80-95	75-90	60-70	35-60	20-30	5-10
	8-26	Gravelly loam, gravelly clay loam.	GC, SC	A-6, A-7	0-10	60-80	55-75	45-60	35-50	30-45	10-20
	26-60	Indurated--------	---	---	---	---	---	---	---	---	---
923-------------- Nevador Variant	0-4	Very gravelly loam.	GM-GC	A-2	0-15	45-55	40-50	30-40	25-35	20-30	5-10
	4-23	Gravelly loam, gravelly clay loam.	GC, SC	A-6, A-7	0-10	60-80	55-75	45-60	35-50	30-45	10-20
	23-60	Indurated--------	---	---	---	---	---	---	---	---	---
931*:											
Temo------------	0-6	Stony loamy coarse sand.	SP-SM	A-1	10-25	85-100	50-70	20-45	5-10	---	NP
	6-9	Gravelly loamy coarse sand, coarse sand, gravelly coarse sand.	SP-SM, SM	A-1	0-5	70-100	50-80	20-45	5-15	---	NP
	9	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
931*: Rock outcrop.											
932*: Temo	0-10	Extremely stony loamy coarse sand.	SP-SM, SM	A-1	25-50	65-85	50-75	25-40	5-20	---	NP
	10-16	Gravelly loamy coarse sand, coarse sand, gravelly coarse sand.	SP-SM, SM	A-1	0-5	70-100	50-80	20-45	5-15	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
941*: Toiyabe	0-7	Very stony loamy coarse sand.	SP-SM, SM	A-1	15-40	70-100	60-85	20-50	5-20	---	NP
	7-15	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
942*: Toiyabe	0-6	Very stony loamy coarse sand.	SP-SM, SM	A-1	15-40	70-100	60-85	20-50	5-20	---	NP
	6-17	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	17	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
951, 952 Toll	0-4	Sand	SP-SM	A-1, A-3	0	90-100	90-100	45-60	5-10	---	NP
	4-54	Loamy sand	SM	A-2	0	95-100	95-100	50-60	15-25	---	NP
	54-60	Coarse sand, loamy coarse sand, sand.	SP-SM	A-1	0	90-100	80-100	25-35	5-10	---	NP
953 Toll	0-4	Sand	SP-SM	A-1, A-3	0	90-100	90-100	45-60	5-10	---	NP
	4-43	Loamy sand	SM	A-2	0	95-100	95-100	50-60	15-25	---	NP
	43-60	Clay loam, clay	CH	A-7	0	100	100	90-100	75-85	50-65	30-40
961*: Burnborough	0-14	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	14-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Glean	0-19	Stony loam	GM, SM	A-2, A-4	15-25	65-80	60-75	40-65	25-45	20-30	NP-5
	19-60	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
962*: Burnborough	0-10	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	10-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
962*:											
Pernty	0-4	Very stony loam	GC	A-2	20-30	50-60	45-55	35-45	25-35	30-35	10-15
	4-19	Very cobbly clay loam, very gravelly clay loam, very gravelly loam.	GC	A-6, A-7	10-30	50-60	45-55	40-50	35-45	35-45	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Glean	0-23	Very stony loam	GM, SM	A-2	20-35	55-70	50-65	40-55	25-35	20-30	NP-5
	23-60	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
963*:											
Burnborough	0-10	Very stony loam	GC, GM-GC	A-2	30-40	60-65	45-55	35-45	25-35	20-35	5-15
	10-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	30-55	20-35	15-30	25-40	10-20
Sup	0-12	Stony loam	SM	A-1, A-2	5-15	60-80	30-60	25-50	20-35	15-25	NP-5
	12-60	Stratified very gravelly loam to extremely gravelly coarse sandy loam.	GP-GM, GM	A-1	25-40	35-55	20-50	15-35	5-25	15-25	NP-5
Chen	0-5	Extremely stony loam.	GC	A-2	50-60	50-60	35-45	30-40	25-35	25-35	10-15
	5-15	Very gravelly clay.	GC	A-2	5-15	45-55	30-40	30-40	25-35	55-65	35-40
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
972*:											
Trid	0-5	Sandy loam	SM	A-1, A-2	0-5	90-100	85-100	45-55	20-30	---	NP
	5-32	Very gravelly clay loam, very gravelly sandy clay loam.	SC	A-2, A-6	5-15	70-80	35-55	15-45	15-40	35-40	15-20
	32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Trid	0-8	Sand	SP-SM	A-1	0-5	90-100	85-100	35-50	5-10	---	NP
	8-31	Very gravelly clay loam, very gravelly sandy clay loam.	SC	A-2, A-6	5-15	70-80	35-55	15-45	15-40	35-40	15-20
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit	0-8	Coarse sandy loam	SM	A-1, A-2	0	90-95	75-85	30-40	20-30	15-25	NP-5
	8-15	Gravelly coarse sandy loam.	SM	A-1	0-5	75-85	55-75	25-35	15-25	15-25	NP-5
	15-60	Very gravelly coarse sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-15	45-70	35-45	20-30	10-20	15-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
973*:											
Trid	0-6	Very stony fine sandy loam.	SC	A-2	25-35	85-95	35-50	20-40	10-30	25-35	10-20
	6-34	Extremely gravelly clay loam, extremely gravelly sandy clay loam, very gravelly clay loam.	SC, SP-SC	A-2	0-5	60-80	15-40	10-35	5-30	35-40	15-20
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit	0-15	Extremely stony sandy loam.	SM	A-1	20-45	60-75	45-55	25-40	10-25	15-25	NP-5
	15-60	Very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly fine sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-50	45-75	35-55	10-30	10-25	15-30	NP-10
Duco	0-4	Extremely stony loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	4-14	Very gravelly sandy clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
974*:											
Trid	0-6	Very stony fine sandy loam.	SC	A-2	25-35	85-95	35-50	20-40	10-30	25-35	10-20
	6-34	Extremely gravelly clay loam, extremely gravelly sandy clay loam, very gravelly clay loam.	SC, SP-SC	A-2	0-5	60-80	15-40	10-35	5-30	35-40	15-20
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
Roloc	0-9	Gravelly sandy loam.	SM	A-1	0-5	80-90	55-80	30-40	10-20	---	NP
	9-18	Very gravelly coarse sandy loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	15-30	20-30	5-10
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Drit	0-8	Coarse sandy loam	SM	A-1, A-2	0	90-95	75-85	30-40	20-30	15-25	NP-5
	8-15	Gravelly coarse sandy loam.	SM	A-1	0-5	75-85	55-75	25-35	15-25	15-25	NP-5
	15-60	Very gravelly coarse sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	5-15	45-70	35-45	20-30	10-20	15-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
975*:											
Trid	0-8	Very stony loam	SC	A-2	25-35	85-95	35-50	20-40	10-30	25-35	10-20
	8-26	Extremely gravelly clay loam, extremely gravelly sandy clay loam, very gravelly clay loam.	SC, SP-SC	A-2	0-5	60-80	15-40	10-35	5-30	35-40	15-20
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Roloc	0-9	Gravelly sandy loam.	SM	A-1	0-5	80-90	55-80	30-40	10-20	---	NP
	9-15	Very gravelly coarse sandy loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	15-30	20-30	5-10
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Glean	0-6	Stony sandy loam	GM, SM	A-2, A-4	15-25	65-80	60-75	40-65	25-45	20-30	NP-5
	6-30	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	10-25	30-65	25-60	20-50	15-30	20-30	NP-5
	30-60	Very cobbly loam, very cobbly sandy loam, very gravelly sandy loam.	GM, SM	A-1, A-2	20-45	45-70	40-65	30-55	15-35	20-30	NP-5
976*:											
Trid	0-11	Stony sandy loam	SM	A-1	5-15	80-90	30-45	15-30	10-15	15-25	NP-5
	11-30	Extremely gravelly clay loam, extremely gravelly sandy clay loam, very gravelly clay loam.	SC, SP-SC	A-2	0-5	60-80	15-40	10-35	5-30	35-40	15-20
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Roloc	0-6	Extremely stony sandy loam.	SM	A-1	35-45	75-85	40-50	25-35	10-20	---	NP
	6-14	Very gravelly coarse sandy loam, very gravelly loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	10-30	20-30	5-10
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mottsville	0-16	Gravelly loamy coarse sand.	SP-SM, SM	A-1	0	80-100	55-75	20-35	5-15	---	NP
	16-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
977*:											
Trid	0-11	Very stony loam	SC	A-2	25-35	85-95	35-50	20-40	10-30	25-35	10-20
	11-34	Extremely gravelly clay loam, extremely gravelly sandy clay loam, very gravelly clay loam.	SC, SP-SC	A-2	0-5	60-80	15-40	10-35	5-30	35-40	15-20
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
977*: Roloc	0-9	Extremely stony sandy loam.	SM	A-1	35-45	75-85	40-50	25-35	10-20	---	NP
	9-16	Very gravelly coarse sandy loam, very gravelly loam.	SM-SC	A-2	0-5	70-80	35-50	20-35	10-30	20-30	5-10
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sup	0-12	Very stony sandy loam.	SM	A-1	15-25	60-80	35-50	25-40	15-25	15-25	NP-5
	12-60	Stratified very gravelly loam to extremely gravelly coarse sandy loam.	GP-GM, GM	A-1	25-40	35-55	20-50	15-35	5-25	15-25	NP-5
982 Turria	0-2	Loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	65-75	25-35	5-15
	2-12	Clay loam, loam	CL	A-6, A-7	0	100	100	90-100	65-80	35-45	15-20
	12-60	Stratified very fine sandy loam to silt loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	60-80	25-35	5-15
985 Turria	0-6	Clay loam	CL	A-6	0	100	100	90-100	70-80	35-40	15-20
	6-18	Clay loam, loam	CL	A-6, A-7	0	100	100	95-100	65-80	35-45	15-25
	18-60	Stratified very fine sandy loam to silt loam.	CL-ML, ML	A-4	0	100	100	90-100	70-90	25-35	5-10
986 Turria	0-7	Silty clay loam	CL	A-6	0	100	100	90-100	70-85	35-40	15-20
	7-19	Clay loam, loam	CL	A-6, A-7	0	100	100	90-100	65-80	35-45	15-20
	19-60	Stratified very fine sandy loam to silt loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	60-80	25-35	5-15
992 Updike	0-2	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	2-41	Clay, sandy clay	CH	A-7	0	100	100	80-90	60-75	50-65	30-40
	41-60	Loamy sand	SM	A-2	0	100	100	70-80	20-30	---	NP
993*: Updike	0-2	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	2-30	Clay, sandy clay	CH	A-7	0	100	100	80-90	60-75	50-65	30-40
	30-60	Sandy clay loam	SC, CL	A-6, A-7	0	100	100	75-90	35-60	30-45	10-25
Springmeyer	0-8	Silt loam	CL	A-6	0	100	100	85-95	65-75	30-35	10-15
	8-30	Clay loam, sandy clay loam.	CL	A-7, A-6	0	100	85-95	80-90	50-75	35-45	15-25
	30-60	Stratified loam to gravelly clay loam.	CL	A-6	0	90-100	85-95	70-90	60-70	30-40	10-20
994 Updike	0-2	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	2-41	Clay, sandy clay	CH	A-7	0	100	100	80-90	60-75	50-65	30-40
	41-60	Loamy sand	SM	A-2	0	100	100	70-80	20-30	---	NP
1011*: Verdico	0-3	Very gravelly loam.	GC	A-2	0-5	50-60	40-50	40-45	30-35	30-35	10-15
	3-30	Clay	CH	A-7	0-5	95-100	85-95	80-90	70-85	50-65	35-40
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Puett	0-2	Gravelly sandy loam.	SM-SC	A-2	0-5	70-80	60-70	45-55	20-35	25-30	5-10
	2-18	Stratified fine sandy loam to loamy fine sand.	SM	A-2	0	85-95	80-90	50-60	20-35	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1012*:											
Verdico----------	0-4	Gravelly loam----	SC	A-6	0-5	70-80	60-70	55-65	40-50	30-35	10-15
	4-35	Clay--------------	CH	A-7	0-5	95-100	85-95	80-90	70-85	50-65	35-40
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Uhaldi----------	0-5	Very stony loam	SC	A-6	40-50	70-80	60-75	50-60	40-50	30-35	10-15
	5-24	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Springmeyer-----	0-10	Gravelly loam----	SC	A-2, A-6	0-5	65-80	55-75	45-60	25-40	25-35	10-15
	10-25	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	25-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
1021-------------- Veta	0-3	Very gravelly sandy loam.	GP-GM, GM	A-1	0-25	40-55	35-50	20-35	10-20	---	NP
	3-18	Extremely gravelly loam, very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-30	40-55	30-50	20-40	15-30	---	NP
	18-60	Stratified extremely gravelly loamy sand to very gravelly loam.	GP-GM, GM	A-1	10-25	30-55	20-50	15-35	5-20	---	NP
1031*:											
Vicee-----------	0-13	Gravelly very fine sandy loam.	SM	A-4	0-5	70-80	60-75	55-70	35-50	20-30	NP-5
	13-60	Gravelly very fine sandy loam.	ML	A-4	0	75-90	70-75	65-75	50-60	20-30	NP-5
Rock outcrop.											
1041-------------- Voltaire	0-20	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-90	35-45	15-20
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	95-100	80-90	65-75	30-40	10-20
1042-------------- Voltaire	0-20	Silty clay--------	CH	A-7	0	100	100	95-100	90-95	55-60	30-35
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	95-100	80-90	65-75	30-40	10-20
1044-------------- Voltaire	0-20	Clay--------------	CH	A-7	0	100	100	90-100	80-90	55-60	30-35
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	95-100	80-90	65-75	30-40	10-20
1051-------------- Voltaire Variant	0-6	Clay loam---------	CL	A-7	0	100	100	90-100	75-85	40-45	20-25
	6-25	Silty clay--------	CH	A-7	0	100	100	95-100	85-95	50-60	25-30
	25-60	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	90-100	75-85	25-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1061----------- Washoe	0-11	Gravelly sandy loam.	SM	A-1	0-10	70-80	60-70	35-50	15-25	---	NP
	11-42	Very gravelly sandy clay loam, very gravelly sandy loam.	GC, SC	A-2, A-6	5-20	55-80	50-65	40-55	20-50	25-35	10-20
	42-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-70	40-60	20-40	5-20	---	NP
1062----------- Washoe	0-5	Very gravelly sandy loam.	GM-GC, SM-SC	A-2	0-5	50-75	25-50	20-40	10-25	20-30	5-10
	5-35	Very gravelly sandy clay loam, very gravelly sandy loam.	GC	A-2, A-6	5-20	55-70	45-55	40-50	20-40	25-35	10-15
	35-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-80	50-75	20-40	5-20	---	NP
1063----------- Washoe	0-11	Cobbly sandy loam	SM	A-2, A-4	20-30	80-90	70-80	40-55	25-50	---	NP
	11-42	Very gravelly sandy clay loam, very gravelly sandy loam.	GC, SC	A-2, A-6	5-20	55-80	50-65	40-55	20-50	25-35	10-20
	42-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-70	40-60	20-40	5-20	---	NP
1066*: Washoe----------	0-7	Stony loam--------	SM	A-2, A-4	20-30	80-90	70-80	40-55	25-50	---	NP
	7-32	Very gravelly sandy clay loam, very gravelly sandy loam.	GC, SC	A-2, A-6	5-20	55-80	50-65	40-55	20-50	25-35	10-20
	32-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-70	40-60	20-40	5-20	---	NP
Reno------------	0-4	Cobbly sandy loam	SM	A-2	15-30	75-95	70-90	50-70	25-35	15-25	NP-5
	4-31	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-55	25-35
	31-44	Indurated---------	---	---	---	---	---	---	---	---	---
	44-60	Very gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
1071----------- Corbett	0-3	Gravelly sand----	SP-SM	A-1, A-2, A-3	0-5	75-95	50-75	30-60	5-10	---	NP
	3-24	Gravelly loamy coarse sand, gravelly loamy sand.	SM	A-1	0-5	70-95	50-75	30-50	10-15	---	NP
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1072*:											
Corbett---------	0-3	Loamy coarse sand	SM	A-1	0-5	95-100	75-85	40-50	15-20	---	NP
	3-24	Gravelly loamy coarse sand, gravelly loamy sand.	SM	A-1	0-5	70-95	50-75	30-50	10-15	---	NP
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Toiyabe---------	0-7	Stony loamy coarse sand.	SP-SM, SM	A-1	5-20	70-100	60-85	20-50	5-20	---	NP
	7-15	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
1073*:											
Corbett---------	0-7	Loamy coarse sand	SM	A-1	0-5	95-100	75-85	40-50	15-20	---	NP
	7-38	Gravelly loamy coarse sand, gravelly loamy sand.	SM	A-1	0-5	70-95	50-75	30-50	10-15	---	NP
	38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Toiyabe---------	0-7	Loamy coarse sand	SP-SM, SM	A-1	0	75-100	75-90	30-50	5-20	---	NP
	7-14	Loamy coarse sand, gravelly loamy coarse sand, sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
1081*:											
Zephan----------	0-5	Very stony sandy loam.	SM-SC	A-2	10-25	65-80	55-65	35-45	15-25	20-30	5-10
	5-26	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Zephan----------	0-3	Gravelly sandy loam.	SM, GM	A-2, A-1	0-10	60-80	55-75	40-50	20-35	20-25	NP-5
	3-29	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	29	Weathered bedrock	---	---	---	---	---	---	---	---	---
1091*:											
Uhaldi----------	0-5	Stony loam-------	GC, SC	A-6	5-15	65-75	55-65	50-60	35-45	30-35	10-15
	5-24	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1091*:											
Nosrac----------	0-13	Very stony loam	GC	A-2	20-30	35-55	30-50	30-45	20-30	30-35	10-15
	13-34	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	34-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
1101*:											
Pung------------	0-6	Stony loam-------	GC, SC	A-6	10-15	55-80	55-75	40-65	35-50	30-35	10-15
	6-30	Clay-------------	CH	A-7	0-5	90-100	80-90	75-85	65-80	55-70	35-50
	30-60	Loam, sandy loam	SM-SC	A-2, A-4	0-5	90-100	80-90	55-75	30-50	20-30	5-10
Phing-----------	0-2	Very gravelly loam.	GM, GM-GC, SM, SM-SC	A-2	5-10	50-60	45-55	30-40	20-30	25-35	5-15
	2-32	Clay-------------	CH	A-7	0-10	95-100	85-95	80-85	70-80	60-75	35-50
	32-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0-10	80-100	75-90	70-80	60-80	35-55	15-30
Chalco----------	0-4	Very stony loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	4-17	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	17	Weathered bedrock	---	---	---	---	---	---	---	---	---
1102*:											
Pung------------	0-6	Stony loam-------	GC, SC	A-6	10-15	55-80	55-75	40-65	35-50	30-35	10-15
	6-30	Clay-------------	CH	A-7	0-5	90-100	80-90	75-85	65-80	55-70	35-50
	30-60	Loam, sandy loam	SM-SC	A-2, A-4	0-5	90-100	80-90	55-75	30-50	20-30	5-10
Pula------------	0-5	Very cobbly loam	GC	A-2, A-6	25-50	50-75	45-70	40-60	30-50	30-35	10-15
	5-30	Very gravelly clay loam, extremely gravelly clay loam, extremely gravelly clay.	GC	A-2, A-7	10-30	30-60	20-55	20-50	15-45	50-60	30-40
	30-60	Extremely gravelly sandy loam, extremely gravelly sandy clay loam.	GM-GC, GC, GP-GM, GP-GC	A-1, A-2	20-30	35-45	15-25	10-20	5-15	20-35	NP-15
Uhaldi----------	0-10	Stony loam-------	GC, SC	A-6	5-15	65-75	55-65	50-60	35-45	30-35	10-15
	10-35	Gravelly clay loam.	CL, GC	A-6, A-7	0-10	55-85	50-80	45-75	40-60	35-45	15-25
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
1111------------ Stucky	0-8	Extremely cobbly sandy loam.	GM	A-1, A-2	35-45	40-50	30-40	25-35	15-30	15-25	NP-5
	8-28	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	GC	A-2	35-75	45-60	35-50	30-45	15-30	30-40	15-20
	28-60	Stratified extremely cobbly sandy loam to very stony clay loam.	GC, GM-GC	A-2	35-50	45-60	35-50	25-45	15-35	20-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1112*:											
Stucky-----------	0-3	Very cobbly loam	GM	A-2, A-4	25-40	50-70	45-65	35-55	25-45	15-25	NP-5
	3-21	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	GC	A-2	35-75	45-60	35-50	30-45	15-30	30-40	15-20
	21-60	Stratified extremely cobbly sandy loam to very stony clay loam.	GC, GM-GC	A-2	35-50	45-60	35-50	25-45	15-35	20-35	5-15
Stucky-----------	0-5	Very cobbly loam	GM	A-2, A-4	25-40	50-70	45-65	35-55	25-45	15-25	NP-5
	5-25	Extremely cobbly sandy clay loam, very cobbly sandy clay loam.	GC	A-2	35-75	45-60	35-50	30-45	15-30	30-40	15-20
	25-60	Stratified extremely cobbly sandy loam to very stony clay loam.	GC, GM-GC	A-2	35-50	45-60	35-50	25-45	15-35	20-35	5-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
101------------- Aldax	0-3	10-18	2.0-6.0	0.07-0.10	5.6-7.3	<2	Low----------	0.28	2	8
	3-14	10-18	2.0-6.0	0.07-0.10	5.6-7.3	<2	Low----------	0.28		
	14	---	---	---	---	---	-------------	----		
102*:										
Aldax-----------	0-3	10-18	2.0-6.0	0.07-0.10	5.6-7.3	<2	Low----------	0.28	2	8
	3-14	10-18	2.0-6.0	0.07-0.10	5.6-7.3	<2	Low----------	0.28		
	14	---	---	---	---	---	-------------	----		
Indiano---------	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low----------	0.32	3	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
111------------- Borda	0-10	15-20	2.0-6.0	0.11-0.13	6.1-7.3	<2	Low----------	0.17	3	4
	10-34	45-60	0.06-0.2	0.14-0.16	6.1-8.4	<2	High---------	0.20		
	34-50	25-35	0.2-2.0	0.16-0.20	7.9-8.4	<2	Moderate-----	0.20		
	50	---	---	---	---	---	-------------	----		
121*:										
Borda Variant---	0-6	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low----------	0.10	5	8
	6-27	40-50	0.06-0.2	0.09-0.11	6.1-7.3	<2	Moderate-----	0.10		
	27-60	20-30	0.2-0.6	0.09-0.10	6.1-7.3	---	Low----------	0.10		
Genoa-----------	0-6	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low----------	0.10	1	8
	6-16	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low----------	0.10		
	16	---	---	---	---	---	-------------	----		
Burnborough Variant--------	0-5	15-20	0.6-2.0	0.13-0.15	5.6-7.3	<2	Low----------	0.24	2	6
	5-30	25-35	0.2-0.6	0.10-0.13	6.6-7.3	<2	Moderate-----	0.24		
	30	---	---	---	---	---	-------------	----		
122*:										
Borda Variant---	0-6	15-20	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low----------	0.10	5	8
	6-39	40-50	0.06-0.2	0.09-0.11	6.1-7.3	<2	Moderate-----	0.10		
	39-60	20-30	0.2-0.6	0.09-0.10	6.1-7.3	---	Low----------	0.10		
Borda Variant---	0-4	15-20	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low----------	0.10	5	8
	4-34	40-50	0.06-0.2	0.09-0.11	6.1-7.3	<2	Moderate-----	0.10		
	34-60	20-30	0.2-0.6	0.09-0.10	6.1-7.3	---	Low----------	0.10		
Glean-----------	0-27	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low----------	0.15	3	8
	27-42	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low----------	0.10		
	42-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low----------	0.10		
123*:										
Borda Variant---	0-5	15-20	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low----------	0.10	5	8
	5-37	40-50	0.06-0.2	0.09-0.11	6.1-7.3	<2	Moderate-----	0.10		
	37-60	20-30	0.2-0.6	0.09-0.10	6.1-7.3	---	Low----------	0.10		
Glean-----------	0-28	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low----------	0.10	5	8
	28-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low----------	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
123*:										
Chen	0-6	10-15	0.6-2.0	0.06-0.07	6.1-7.3	<2	Low	0.17	1	8
	6-17	40-50	<0.06	0.05-0.06	6.1-7.3	<2	Moderate	0.17		
	17	---	---	---	---	---	---	---		
124*:										
Borda Variant	0-5	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low	0.10	5	8
	5-30	40-50	0.06-0.2	0.09-0.11	6.1-7.3	<2	Moderate	0.10		
	30-60	20-30	0.2-0.6	0.09-0.10	6.1-7.3	---	Low	0.10		
Burnborough Variant	0-6	15-20	0.6-2.0	0.13-0.15	5.6-7.3	<2	Low	0.24	2	6
	6-37	25-35	0.2-0.6	0.10-0.13	6.6-7.3	<2	Moderate	0.24		
	37	---	---	---	---	---	---	---		
Cassiro	0-7	10-20	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low	0.17	5	6
	7-40	40-50	0.2-0.6	0.05-0.06	6.1-7.3	<2	Moderate	0.10		
	40-60	15-30	0.6-2.0	0.09-0.10	6.6-7.8	<2	Moderate	0.10		
141 Brockliss	0-15	1-5	6.0-20	0.05-0.07	6.1-7.3	<2	Low	0.10	5	8
	15-60	1-3	>20	0.03-0.05	6.1-7.3	<2	Low	0.10		
151*:										
Cagle	0-2	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	2-17	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	17-30	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate	0.24		
	30	---	---	---	---	---	---	---		
Deven	0-2	20-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low	0.15	1	8
	2-17	35-50	0.06-0.2	0.13-0.17	6.1-7.3	<2	High	0.28		
	17	---	---	---	---	---	---	---		
Nosrac	0-8	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.28	5	8
	8-35	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	35-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
152*:										
Cagle	0-4	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	4-16	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	16-24	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate	0.24		
	24	---	---	---	---	---	---	---		
Duco	0-4	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.24	1	8
	4-14	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	14	---	---	---	---	---	---	---		
153*:										
Cagle	0-3	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	3-17	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	17-30	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate	0.24		
	30	---	---	---	---	---	---	---		
Duco	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.24	1	8
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	19	---	---	---	---	---	---	---		
Rock outcrop.										
154*:										
Cagle	0-4	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	4-28	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	28	---	---	---	---	---	---	---		
Nosrac	0-9	27-30	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate	0.28	5	8
	9-34	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	34-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
155*:										
Cagle------------	0-3	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low-----------	0.24	3	8
	3-18	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High----------	0.24		
	18-30	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate------	0.24		
	30	---	---	---	---	---	--------------	----		
Nosrac-----------	0-7	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low-----------	0.28	5	8
	7-32	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low-----------	0.32		
	32-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate------	0.28		
Borda------------	0-5	27-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate------	0.15	3	7
	5-35	45-60	0.06-0.2	0.14-0.16	6.1-8.4	<2	High----------	0.20		
	35-50	25-35	0.2-2.0	0.16-0.20	7.9-8.4	<2	Moderate------	0.20		
	50	---	---	---	---	---	--------------	----		
156*:										
Cagle------------	0-3	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low-----------	0.24	3	8
	3-28	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High----------	0.24		
	28-35	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate------	0.24		
	35	---	---	---	---	---	--------------	----		
Burnborough------	0-14	10-25	0.6-2.0	0.10-0.13	6.1-7.3	<2	Moderate------	0.24	5	7
	14-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate------	0.28		
Rock outcrop.										
161*:										
Witefels---------	0-5	0-5	6.0-20	0.04-0.06	5.1-6.5	<2	Low-----------	0.10	2	3
	5-40	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	40	---	---	---	---	---	--------------	----		
Rock outcrop.										
162*:										
Witefels---------	0-3	0-5	6.0-20	0.03-0.05	5.1-6.5	<2	Low-----------	0.10	2	5
	3-31	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	31	---	---	---	---	---	--------------	----		
Rock outcrop.										
163*:										
Witefels---------	0-8	0-5	6.0-20	0.03-0.05	5.1-6.5	<2	Low-----------	0.10	2	5
	8-32	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	32	---	---	---	---	---	--------------	----		
Rock outcrop.										
164*:										
Witefels---------	0-3	0-5	6.0-20	0.03-0.05	5.1-6.5	<2	Low-----------	0.10	2	5
	3-40	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	40	---	---	---	---	---	--------------	----		
Rock outcrop.										
165*:										
Witefels---------	0-4	0-5	6.0-20	0.04-0.06	5.1-6.5	<2	Low-----------	0.10	2	3
	4-39	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	39	---	---	---	---	---	--------------	----		
Temo-------------	0-9	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.10	1	4
	9-19	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.17		
	16	---	---	---	---	---	--------------	----		
181*:										
Chalco-----------	0-1	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low-----------	0.10	1	7
	1-14	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High----------	0.24		
	14	---	---	---	---	---	--------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodi-bility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
181*:										
Chalco----------	0-5	10-15	2.0-6.0	0.12-0.14	6.1-7.3	<2	Low-----------	0.20	1	4
	5-17	40-60	<0.06	0.12-0.15	6.1-7.3	<2	High----------	0.24		
	17	---	---	---	---	---	--------------	----		
182*:										
Chalco----------	0-5	10-15	0.6-2.0	0.08-0.09	6.1-7.3	<2	Low-----------	0.10	1	5
	5-18	40-60	<0.06	0.12-0.15	6.1-7.3	<2	High----------	0.24		
	18	---	---	---	---	---	--------------	----		
Pula------------	0-5	18-24	0.6-2.0	0.07-0.09	6.6-7.3	<2	Moderate------	0.10	5	8
	5-25	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate------	0.10		
	25-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low-----------	0.10		
183*:										
Chalco----------	0-3	10-15	2.0-6.0	0.12-0.14	6.1-7.3	<2	Low-----------	0.20	1	4
	3-18	40-60	<0.06	0.12-0.15	6.1-7.3	<2	High----------	0.24		
	18	---	---	---	---	---	--------------	----		
Chalco----------	0-2	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low-----------	0.10	1	7
	2-11	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High----------	0.24		
	11	---	---	---	---	---	--------------	----		
191-------------- Cradlebaugh	0-17	27-35	0.2-0.6	0.18-0.20	>8.4	4-8	Moderate------	0.28	5	6
	17-39	20-30	0.2-0.6	0.18-0.20	>8.4	4-16	Moderate------	0.24		
	39-60	5-15	2.0-6.0	0.13-0.15	>8.4	4-16	Low-----------	0.20		
192-------------- Cradlebaugh	0-9	27-35	0.2-0.6	0.18-0.20	>9.0	>16	Moderate------	0.28	5	6
	9-31	20-30	0.2-0.6	0.18-0.20	>9.0	8-16	Moderate------	0.24		
	31-60	5-15	2.0-6.0	0.13-0.15	8.5-9.0	4-16	Low-----------	0.24		
193-------------- Cradlebaugh	0-17	27-35	0.2-0.6	0.18-0.20	>9.0	>4	Moderate------	0.28	5	6
	17-47	20-30	0.2-0.6	0.18-0.20	>9.0	4-16	Moderate------	0.24		
	47-60	5-15	2.0-6.0	0.13-0.15	8.5-9.0	4-16	Low-----------	0.24		
194-------------- Cradlebaugh	0-9	27-35	0.2-0.6	0.18-0.20	>9.0	>16	Moderate------	0.28	5	6
	9-31	20-30	0.2-0.6	0.18-0.20	>9.0	8-16	Moderate------	0.24		
	31-60	5-15	2.0-6.0	0.13-0.15	8.5-9.0	4-16	Low-----------	0.24		
201-------------- Dangberg	0-6	20-25	0.6-2.0	0.16-0.21	8.5-9.0	>16	Moderate------	0.43	2	6
	6-24	35-45	<0.06	0.14-0.16	>9.0	>16	High----------	0.20		
	24-31	---	---	---	---	---	--------------	----		
	31-60	5-10	2.0-6.0	0.11-0.13	>8.4	4-16	Low-----------	0.20		
202-------------- Dangberg	0-3	40-42	0.06-0.2	0.12-0.15	>8.4	4-8	High----------	0.20	2	4
	3-25	35-50	<0.06	0.12-0.15	>8.4	8-16	High----------	0.20		
	25-43	---	---	---	---	---	--------------	----		
	43-60	1-5	6.0-20	0.04-0.06	>7.8	<8	Low-----------	0.10		
203-------------- Dangberg	0-3	40-42	0.06-0.2	0.12-0.15	>8.4	>16	High----------	0.20	2	4
	3-25	48-50	<0.06	0.14-0.16	>8.4	8-16	High----------	0.32		
	25-43	---	---	---	---	---	--------------	----		
	43-60	2-5	6.0-20	0.05-0.06	>7.8	<8	Low-----------	0.10		
204-------------- Dangberg	0-3	40-42	0.06-0.2	0.12-0.15	>8.4	4-8	High----------	0.20	2	4
	3-25	35-50	<0.06	0.12-0.15	>8.4	8-16	High----------	0.20		
	25-43	---	---	---	---	---	--------------	----		
	43-60	1-5	6.0-20	0.04-0.06	>7.8	<8	Low-----------	0.10		
205-------------- Dangberg--------	0-3	40-42	0.6-0.2	0.12-0.15	>8.4	>16	High----------	0.20	2	4
	3-25	48-50	<0.06	0.14-0.16	>8.4	8-16	High----------	0.32		
	25-43	---	---	---	---	---	--------------	----		
	43-60	2-5	6.0-20	0.05-0.06	>7.8	<8	Low-----------	0.10		
211*:										
Devada----------	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate------	0.15	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High----------	0.17		
	13	---	---	---	---	---	--------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
211*:										
Drit	0-15	7-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10	5	8
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10		
Roloc	0-11	3-8	2.0-6.0	0.07-0.08	6.6-7.3	<2	Low	0.10	1	8
	11-18	10-18	0.6-2.0	0.06-0.07	6.6-7.3	<2	Low	0.10		
	18-28	---	---	---	---	---	---	---		
212*:										
Devada	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.15	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	13	---	---	---	---	---	---	---		
Koontz	0-7	12-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low	0.24	2	8
	7-14	20-35	0.2-0.6	0.09-0.11	6.6-8.4	<2	Moderate	0.24		
	14	---	---	---	---	---	---	---		
213*:										
Devada	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.15	1	8
	4-16	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	16	---	---	---	---	---	---	---		
Burnborough Variant	0-15	15-20	0.6-2.0	0.13-0.15	5.6-7.3	<2	Low	0.24	2	6
	15-40	25-35	0.2-0.6	0.10-0.13	6.6-7.3	<2	Moderate	0.24		
	40	---	---	---	---	---	---	---		
214*:										
Devada	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.15	1	8
	4-16	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	16	---	---	---	---	---	---	---		
Rock outcrop.										
221 East Fork Variant	0-38	18-25	0.6-2.0	0.14-0.16	6.1-7.3	<2	Moderate	0.28	4	5
	38-48	18-25	2.0-6.0	0.14-0.16	6.1-7.3	<2	Moderate	0.32		
	48-60	1-5	>6.0	0.03-0.05	6.6-7.3	<2	Low	0.15		
231*:										
Brockliss Variant	0-6	15-20	0.6-2.0	0.09-0.10	6.1-7.3	<2	Low	0.15	5	7
	6-60	12-17	0.6-2.0	0.05-0.09	6.6-7.8	<2	Low	0.10		
Brockliss Variant	0-6	10-15	2.0-6.0	0.06-0.07	6.1-7.3	<2	Low	0.05	5	5
	6-60	12-17	0.6-2.0	0.05-0.09	6.6-7.8	<2	Low	0.10		
Dangberg	0-6	20-25	0.6-2.0	0.16-0.21	8.5-9.0	4-8	Moderate	0.43	2	6
	6-24	35-45	<0.06	0.14-0.16	>9.0	>16	High	0.20		
	24-31	---	---	---	---	---	---	---		
	31-60	5-10	2.0-6.0	0.11-0.13	>8.4	4-16	Low	0.20		
241, 242 Dressler	0-20	5-10	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low	0.17	5	3
	20-66	2-8	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low	0.17		
251*:										
Duco	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.24	1	8
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	19	---	---	---	---	---	---	---		
Cagle	0-3	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	3-31	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	31-38	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate	0.24		
	38	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
251*:										
Nosrac	0-8	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.28	5	8
	8-33	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	33-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
252*:										
Duco	0-3	10-20	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.28	1	6
	3-10	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	10	---	---	---	---	---	---	---		
Devada	0-3	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.15	1	8
	3-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	13	---	---	---	---	---	---	---		
Nosrac	0-9	10-15	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low	0.24	5	8
	9-31	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	31-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
253*:										
Duco	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.24	1	8
	5-15	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	15	---	---	---	---	---	---	---		
Nosrac	0-10	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.28	5	8
	10-32	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	32-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
254*:										
Duco	0-4	10-20	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.28	1	6
	4-17	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	17	---	---	---	---	---	---	---		
Nosrac	0-10	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.28	5	8
	10-33	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	33-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
Burnborough Variant	0-15	15-20	0.6-2.0	0.13-0.15	5.6-7.3	<2	Low	0.24	2	6
	15-33	25-35	0.2-0.6	0.10-0.13	6.6-7.3	<2	Moderate	0.24		
	33	---	---	---	---	---	---	---		
255*:										
Duco	0-5	10-20	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.28	1	6
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	19	---	---	---	---	---	---	---		
Searles	0-4	18-22	0.6-2.0	0.08-0.09	6.6-7.8	<2	Low	0.24	2	8
	4-27	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Low	0.20		
	27	---	---	---	---	---	---	---		
261*:										
Dumps.										
Pits.										
271 East Fork	0-11	20-27	0.6-2.0	0.16-0.18	6.6-7.3	<2	Moderate	0.37	5	5
	11-45	25-35	0.2-0.6	0.15-0.19	6.6-8.4	<2	Moderate	0.28		
	45-60	25-35	0.2-0.6	0.15-0.19	6.6-8.4	<2	Moderate	0.28		
272 East Fork	0-11	27-35	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate	0.28	5	6
	11-30	25-35	0.2-0.6	0.15-0.19	6.6-8.4	<2	Moderate	0.28		
	30-60	25-35	0.2-0.6	0.15-0.19	6.6-8.4	<2	Moderate	0.28		
281 Fettic	0-4	2-10	0.6-2.0	0.15-0.17	7.9-9.0	2-4	Low	0.32	5	3
	4-29	27-35	<0.06	0.19-0.21	>9.0	8-16	Moderate	0.28		
	29-60	2-8	2.0-20	0.07-0.14	7.9-8.4	<8	Low	0.17		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
282 Fettic	0-4	40-45	0.06-0.2	0.14-0.16	8.5-9.0	>16	High	0.24	5	4
	4-29	27-35	<0.06	0.19-0.21	>9.0	>8	Moderate	0.28		
	29-60	2-8	2.0-20	0.07-0.14	7.9-8.4	<4	Low	0.17		
292*: Vicee Variant	0-14	10-20	0.6-2.0	0.04-0.05	6.1-7.3	<2	Low	0.28	2	8
	14-21	10-20	0.6-2.0	0.04-0.05	6.1-7.3	<2	Low	0.28		
	21-36	10-20	0.6-2.0	0.04-0.05	6.1-7.3	<2	Low	0.28		
	36-40	---	---	---	---	---	---	---		
Rock outcrop.										
301*: Franktown	0-5	5-10	2.0-6.0	0.06-0.08	5.6-6.5	<2	Low	0.20	1	8
	5-10	5-10	2.0-6.0	0.05-0.07	5.6-6.5	<2	Low	0.20		
	10	---	---	---	---	---	---	---		
Rubble land.										
Rock outcrop.										
311 Gardnerville	0-3	27-35	0.2-0.6	0.19-0.21	6.6-7.8	4-8	Moderate	0.28	5	6
	3-16	35-45	0.06-0.2	0.15-0.20	6.6-7.8	4-8	High	0.17		
	16-60	2-8	6.0-20	0.05-0.08	7.4-8.4	<8	Low	0.15		
312 Gardnerville	0-3	27-30	0.2-0.6	0.19-0.21	6.6-7.8	<4	Moderate	0.28	5	6
	3-16	35-45	0.06-0.2	0.15-0.20	6.6-7.8	4-8	High	0.17		
	16-60	2-8	6.0-20	0.05-0.08	7.4-8.4	<8	Low	0.15		
313 Gardnerville	0-3	27-32	0.2-0.6	0.15-0.20	6.6-8.4	4-8	Moderate	0.28	5	5
	3-16	35-45	0.06-0.2	0.15-0.20	6.6-9.0	4-8	High	0.28		
	16-60	2-8	6.0-20	0.05-0.08	6.6-7.8	<8	Low	0.15		
314 Gardnerville	0-7	40-45	0.06-0.2	0.14-0.16	6.6-7.8	<4	High	0.20	5	5
	7-18	35-45	0.06-0.2	0.15-0.20	6.6-7.8	4-8	High	0.17		
	18-60	2-8	6.0-20	0.05-0.08	7.4-8.4	<8	Low	0.15		
315 Gardnerville	0-6	40-45	0.06-0.2	0.14-0.16	8.5-9.0	4-8	High	0.24	5	5
	6-16	35-45	0.06-0.2	0.15-0.20	6.6-9.0	8-16	High	0.28		
	16-60	2-8	6.0-20	0.05-0.08	6.6-7.8	<8	Low	0.15		
321*: Genoa	0-4	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low	0.10	1	8
	4-16	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low	0.10		
	16	---	---	---	---	---	---	---		
Glean	0-6	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low	0.15	3	8
	6-39	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
	39-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low	0.10		
322*: Genoa	0-4	18-23	0.6-2.0	0.08-0.09	6.1-7.3	<2	Low	0.10	1	8
	4-12	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low	0.10		
	12	---	---	---	---	---	---	---		
Glean	0-6	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low	0.15	3	8
	6-25	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
	25-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low	0.10		
Rock outcrop.										
331*: Glean	0-6	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10	5	8
	6-28	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
	28-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
331*:										
Genoa-----------	0-2	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	1	8
	2-19	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low-----------	0.10		
	19	---	---	---	---	---	-------------	----		
Glean-----------	0-6	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10	5	8
	6-30	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
	30-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low-----------	0.10		
332*:										
Glean-----------	0-6	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10	3	8
	6-25	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
	25-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low-----------	0.10		
Genoa-----------	0-4	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	1	8
	4-16	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low-----------	0.10		
	16	---	---	---	---	---	-------------	----		
Rubble land.										
334*:										
Glean-----------	0-2	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low-----------	0.15	3	8
	2-23	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
	23-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low-----------	0.10		
Sup-------------	0-12	7-15	0.6-2.0	0.09-0.11	5.6-6.5	<2	Low-----------	0.10	5	8
	12-60	5-15	2.0-6.0	0.05-0.07	5.6-6.5	<2	Low-----------	0.05		
Genoa-----------	0-2	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	1	8
	2-19	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low-----------	0.10		
	19	---	---	---	---	---	-------------	----		
341*:										
Glenbrook--------	0-8	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	2	2
	8-15	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10		
	15	---	---	---	---	---	-------------	----		
Glenbrook--------	0-9	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	2	2
	9-15	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10		
	15	---	---	---	---	---	-------------	----		
342*:										
Glenbrook--------	0-9	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	2	2
	9-15	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10		
	15	---	---	---	---	---	-------------	----		
Rock outcrop.										
351-------------- Godecke	0-8	10-20	0.2-2.0	0.15-0.18	>7.8	>16	Low-----------	0.37	5	5
	8-18	31-35	0.06-0.2	0.14-0.21	>7.8	8-16	Moderate------	0.28		
	18-60	5-15	2.0-20	0.09-0.13	7.9-9.0	4-8	Low-----------	0.28		
362*:										
Gralic-----------	0-3	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.17	5	8
	3-60	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.17		
Gralic-----------	0-6	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.17	5	8
	6-60	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.17		
Rock outcrop.										
363*:										
Gralic-----------	0-4	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.10	5	8
	4-60	5-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low-----------	0.17		
Rock outcrop.										

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
371------------- Graylock	0-5	1-5	6.0-20	0.04-0.06	5.6-6.5	<2	Low-----------	0.02	3	8
	5-42	1-5	6.0-20	0.04-0.06	5.6-6.0	<2	Low-----------	0.02		
	42	---	---	---	---	---	-------------	----		
372------------- Graylock	0-3	1-5	6.0-20	0.04-0.06	5.6-6.5	<2	Low-----------	0.02	3	8
	3-42	1-5	6.0-20	0.04-0.06	5.6-6.0	<2	Low-----------	0.02		
	42	---	---	---	---	---	-------------	----		
381------------- Greenbrae	0-7	10-18	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low-----------	0.15	5	3
	7-30	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	30-60	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
382------------- Greenbrae	0-9	10-18	2.0-6.0	0.09-0.12	5.6-7.3	<2	Low-----------	0.10	5	2
	9-28	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	28-63	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
391------------- Haybourne	0-10	2-10	6.0-20	0.07-0.08	6.6-7.8	<2	Low-----------	0.15	5	2
	10-29	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	29-60	5-12	6.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
392, 393--------- Haybourne	0-6	8-15	0.6-2.0	0.15-0.17	6.6-7.8	<2	Low-----------	0.37	5	5
	6-25	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	25-60	5-12	6.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
394------------- Haybourne	0-20	5-10	2.0-6.0	0.10-0.13	6.6-7.3	<2	Low-----------	0.20	3	3
	20-40	3-10	6.0-20	0.09-0.11	6.6-7.3	<2	Low-----------	0.17		
	40-60	1-3	>20	0.02-0.03	6.6-8.4	<2	Low-----------	0.10		
401------------- Heidtman	0-7	30-35	0.2-0.6	0.19-0.21	7.4-8.4	2-4	Moderate------	0.32	4	6
	7-47	25-35	0.2-0.6	0.18-0.20	7.9-9.0	4-8	Moderate------	0.32		
	47-60	1-5	>6.0	0.03-0.05	7.4-8.4	2-4	Low-----------	0.10		
402------------- Heidtman	0-7	30-35	0.2-0.6	0.17-0.20	7.4-9.0	4-8	Moderate------	0.32	5	6
	7-40	25-35	0.2-0.6	0.18-0.20	7.9-9.0	4-8	Moderate------	0.32		
	40-60	45-55	0.06-0.2	0.14-0.16	7.9-9.0	4-8	High----------	0.20		
411, 412--------- Henningsen	0-13	10-20	0.6-2.0	0.14-0.16	6.6-7.3	<2	Low-----------	0.37	5	5
	13-60	1-8	>20	0.03-0.04	6.6-7.3	<2	Low-----------	0.10		
413, 414--------- Henningsen	0-13	10-20	0.6-2.0	0.13-0.14	6.6-7.3	<2	Low-----------	0.32	5	6
	13-60	1-8	>20	0.03-0.04	6.6-7.3	<2	Low-----------	0.10		
422------------- Henningsen Variant	0-9	15-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate------	0.32	2	5
	9-28	10-18	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low-----------	0.28		
	28-60	1-7	>20	0.03-0.04	6.6-7.3	<2	Low-----------	0.10		
431*------------- Shalcar family	0-6	---	>6.0	0.22-0.26	---	<2	Low-----------	0.02	5	8
	6-24	5-10	0.6-2.0	0.22-0.26	---	<2	Low-----------	0.02		
	24-30	27-35	0.2-0.6	0.15-0.19	6.1-6.5	<2	Moderate------	0.32		
	30-60	2-8	6.0-20	0.06-0.08	6.1-6.5	<2	Low-----------	0.15		
442------------- Holbrook	0-15	10-15	2.0-6.0	0.11-0.13	6.1-7.3	<2	Low-----------	0.24	5	4
	15-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
443------------- Holbrook	0-7	10-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.28	5	8
	7-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
444*:										
Holbrook---------	0-7	10-15	2.0-6.0	0.11-0.13	6.1-7.3	<2	Low-----------	0.24	5	4
	7-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
Glenbrook--------	0-9	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10	2	2
	9-19	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low-----------	0.10		
	19	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
445*:										
Holbrook---------	0-14	10-20	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	5	8
	14-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
Greenbrae--------	0-8	10-18	2.0-6.0	0.09-0.12	5.6-6.5	<2	Low-----------	0.10	5	2
	8-24	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	24-60	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
Reno-------------	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.17	2	4
	4-38	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	38-60	---	---	---	---	---	--------------	----		
446*:										
Holbrook---------	0-5	10-20	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	5	8
	5-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
Verdico----------	0-2	27-33	0.2-0.6	0.17-0.19	6.6-7.3	<2	Moderate------	0.32	2	6
	2-30	45-60	<0.06	0.13-0.15	6.6-7.8	<2	High----------	0.20		
	30-60	---	---	---	---	---	--------------	----		
451*:										
Hyloc------------	0-9	14-20	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10	1	8
	9-19	40-55	0.06-0.2	0.12-0.15	6.6-7.3	<2	High----------	0.24		
	19	---	---	---	---	---	--------------	----		
	24	---	---	---	---	---	--------------	----		
Ister------------	0-16	10-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.10	2	8
	16-37	25-35	0.2-0.6	0.09-0.14	6.6-7.8	<2	Moderate------	0.10		
	37	---	---	---	---	---	--------------	----		
461--------------- Hussman	0-12	30-40	0.06-0.2	0.14-0.17	7.9-9.0	4-8	High----------	0.28	1	4
	12-60	35-50	0.06-0.2	0.16-0.20	7.9-9.0	4-8	High----------	0.28		
462--------------- Hussman	0-10	30-35	0.2-0.6	0.19-0.21	>9.0	>16	Moderate------	0.28	5	6
	10-60	35-50	0.06-0.2	0.15-0.17	7.9-9.0	4-8	High----------	0.28		
463--------------- Hussman	0-12	35-50	0.06-0.2	0.14-0.17	7.4-7.8	2-4	High----------	0.28	5	4
	12-60	35-50	0.06-0.2	0.16-0.20	7.4-8.4	2-4	High----------	0.28		
471--------------- Incy	0-4	0-5	>20	0.05-0.07	6.6-7.3	<2	Low-----------	0.10	5	1
	4-60	0-5	>20	0.05-0.07	6.6-7.8	<2	Low-----------	0.10		
481--------------- Indian Creek	0-4	8-18	2.0-6.0	0.08-0.12	6.1-7.8	<2	Low-----------	0.24	1	3
	4-16	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	16-28	---	---	---	---	---	--------------	----		
	28-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low-----------	0.17		
482--------------- Indian Creek	0-5	8-18	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.24	1	4
	5-19	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	19-24	---	---	---	---	---	--------------	----		
	24-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low-----------	0.17		
483--------------- Indian Creek	0-3	15-25	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.28	1	7
	3-20	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	20-25	---	---	---	---	---	--------------	----		
	25-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low-----------	0.17		
485*:										
Indian Creek-----	0-4	15-25	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.28	1	7
	4-16	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	16-20	---	---	---	---	---	--------------	----		
	20-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low-----------	0.17		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodi-bility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
485*:										
Haybourne--------	0-5	5-15	2.0-6.0	0.08-0.11	6.6-7.8	<2	Low-----------	0.24	5	3
	5-20	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	20-60	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
486*:										
Indian Creek-----	0-3	15-25	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.28	1	7
	3-20	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	20-25	---	---	---	---	---	--------------	----		
	25-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low-----------	0.17		
Reno-------------	0-3	20-25	0.6-2.0	0.10-0.13	5.6-7.3	<2	Moderate------	0.17	2	8
	3-22	40-50	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.17		
	22-32	---	---	---	---	<2	--------------	----		
	32-60	0-3	>20	0.03-0.05	6.6-8.4	---	Low-----------	0.10		
Cassiro----------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low-----------	0.15	5	8
	5-41	40-50	0.2-0.6	0.05-0.06	6.1-7.3	<2	Moderate------	0.10		
	41-60	15-30	0.6-2.0	0.09-0.10	6.6-7.8	<2	Moderate------	0.10		
487*:										
Indian Creek Variant---------	0-3	15-25	0.6-2.0	0.09-0.10	7.4-7.8	<2	Low-----------	0.15	1	6
	3-18	20-30	0.2-0.6	0.11-0.13	7.4-7.8	<2	Low-----------	0.10		
	18-39	---	---	---	---	---	--------------	----		
	39-60	2-4	6.0-20.0	0.04-0.06	7.4-8.4	<4	Low-----------	0.20		
Cassiro----------	0-6	10-20	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low-----------	0.15	5	8
	6-40	40-50	0.2-0.6	0.05-0.06	6.1-7.3	<2	Moderate------	0.10		
	40-60	15-30	0.6-2.0	0.09-0.10	6.6-7.8	<2	Moderate------	0.10		
Puett------------	0-3	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low-----------	0.15	1	3
	3-13	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low-----------	0.15		
	13	---	---	---	---	---	--------------	----		
488*:										
Indian Creek Variant---------	0-3	10-20	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low-----------	0.20	1	8
	3-15	20-30	0.2-0.6	0.11-0.13	7.4-7.8	<2	Low-----------	0.10		
	15-35	---	---	---	---	---	--------------	----		
	35-60	2-4	6.0-20	0.04-0.06	7.4-8.4	<4	Low-----------	0.20		
Roloc------------	0-5	3-8	2.0-6.0	0.07-0.08	6.6-7.3	<2	Low-----------	0.10	1	8
	5-17	10-18	0.6-2.0	0.06-0.07	6.6-7.3	<2	Low-----------	0.10		
	17	---	---	---	---	---	--------------	----		
491---------------- Indiano	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.32	3	4
	13-31	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate------	0.28		
	31	---	---	---	---	---	--------------	----		
501, 502---------- James Canyon	0-31	15-25	0.6-2.0	0.14-0.16	6.1-7.3	<2	Moderate------	0.32	4	5
	31-60	20-27	0.6-2.0	0.14-0.16	6.1-7.3	<2	Moderate------	0.32		
503---------------- Kimmerling Variant	0-8	---	>6.0	0.22-0.26	6.1-6.5	<2	Low-----------	----	5	---
	8-32	20-25	0.6-2.0	0.16-0.18	6.6-7.3	<2	Moderate------	0.28		
	32	20-30	0.6-2.0	0.11-0.15	6.6-7.3	<2	Moderate------	0.15		
511, 512---------- James Canyon Variant	0-15	18-20	0.6-2.0	0.15-0.17	6.6-8.4	<8	Moderate------	0.28	5	5
	15-36	18-25	0.6-2.0	0.14-0.16	7.9-9.0	2-4	Moderate------	0.24		
	36-60	2-8	6.0-20	0.06-0.08	6.6-7.3	2-4	Low-----------	0.15		
521---------------- Job	0-9	20-25	0.6-2.0	0.16-0.18	7.9-9.0	2-4	Moderate------	0.37	5	5
	9-25	10-15	0.6-2.0	0.14-0.16	7.9-9.0	4-8	Low-----------	0.28		
	25-60	20-35	0.2-0.6	0.17-0.20	7.9-9.0	4-8	Moderate------	0.32		
523---------------- Job	0-9	20-25	0.6-2.0	0.16-0.18	8.5-9.0	2-4	Moderate------	0.37	5	5
	9-25	10-15	0.6-2.0	0.14-0.16	8.5-9.0	4-8	Low-----------	0.28		
	25-60	20-35	0.2-0.6	0.17-0.20	8.5-9.0	4-8	Moderate------	0.32		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
524------------- Job	0-9	20-25	0.6-2.0	0.16-0.18	7.9-8.4	4-8	Moderate-----	0.37	5	5
	9-25	10-15	0.6-2.0	0.14-0.16	7.9-8.4	4-8	Low----------	0.28		
	25-42	20-35	0.2-2.0	0.17-0.20	7.9-8.4	4-8	Moderate-----	0.32		
	42-60	40-50	0.06-0.2	0.14-0.16	7.9-8.4	4-8	High---------	0.24		
531------------- Jubilee	0-5	22-32	0.6-2.0	0.18-0.20	6.1-7.3	<2	Low----------	0.24	5	5
	5-37	8-18	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.15		
	37-60	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low----------	0.10		
532------------- Jubilee	0-10	40-45	0.06-0.2	0.11-0.13	7.4-8.4	4-8	High---------	0.24	5	4
	10-35	7-12	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.24		
	35-60	4-8	6.0-20	0.06-0.08	6.6-7.8	<2	Low----------	0.15		
533------------- Jubilee Variant	0-6	---	>6.0	0.22-0.26	---	<2	Low----------	0.02	5	8
	6-47	7-12	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.24		
	47-60	4-8	6.0-20	0.05-0.07	6.6-7.3	<2	Low----------	0.15		
534*:										
Jubilee---------	0-10	10-20	0.6-2.0	0.16-0.18	6.6-7.8	<4	Low----------	0.37	5	5
	10-38	7-12	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.24		
	38-60	4-8	6.0-20	0.06-0.08	6.6-7.8	<2	Low----------	0.15		
Dressler--------	0-18	5-10	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low----------	0.17	5	3
	18-60	2-8	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low----------	0.17		
Kimmerling------	0-22	20-21	0.6-2.0	0.18-0.20	6.6-8.4	<4	Moderate-----	0.32	5	8
	22-42	25-35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate-----	0.37		
	42-60	10-30	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate-----	0.28		
541*:										
Softscrabble----	0-14	10-20	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low----------	0.05	5	7
	14-27	27-35	0.06-0.2	0.11-0.13	6.1-7.3	<2	Low----------	0.05		
	27-60	20-30	0.2-2.0	0.10-0.12	6.1-7.3	<2	Low----------	0.05		
Glean-----------	0-6	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low----------	0.10	3	8
	6-39	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low----------	0.10		
	39-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low----------	0.10		
Genoa-----------	0-4	15-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low----------	0.10	1	8
	4-18	20-30	0.2-0.6	0.08-0.09	6.1-7.3	<2	Low----------	0.10		
	18	---	---	---	---	---	-------------	----		
552------------- Kimmerling	0-26	20-25	0.6-2.0	0.15-0.17	6.6-7.3	<2	Moderate-----	0.37	5	5
	26-38	20-30	0.2-0.6	0.16-0.18	6.1-7.3	<2	Moderate-----	0.37		
	38-60	5-10	2.0-6.0	0.07-0.08	6.6-7.3	<2	Low----------	0.10		
553------------- Kimmerling	0-8	20-35	0.6-2.0	0.18-0.20	6.6-8.4	<4	Moderate-----	0.32	5	8
	8-48	25-35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate-----	0.37		
	48-60	10-30	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate-----	0.28		
555------------- Kimmerling	0-8	28-35	0.6-2.0	0.19-0.21	6.6-7.8	<2	Moderate-----	0.28	5	8
	8-42	25-35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate-----	0.37		
	42-60	45-60	0.06-0.2	0.14-0.16	6.6-7.8	<2	High---------	0.24		
561*:										
Koontz----------	0-5	12-22	0.6-2.0	0.08-0.09	6.6-7.8	<2	Low----------	0.20	2	8
	5-12	20-35	0.2-0.6	0.09-0.11	6.1-7.8	<2	Moderate-----	0.24		
	12	---	---	---	---	---	-------------	----		
Sutro-----------	0-10	18-25	0.6-2.0	0.10-0.12	6.6-7.3	<2	Moderate-----	0.24	2	8
	10-39	18-25	0.6-2.0	0.12-0.14	6.6-7.3	<2	Moderate-----	0.24		
	39	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
562*:										
Koontz----------	0-3	12-22	0.6-2.0	0.09-0.11	6.6-7.8	<2	Low-----------	0.20	2	8
	3-14	20-35	0.2-0.6	0.09-0.11	6.6-8.4	<2	Moderate------	0.24		
	14	---	---	---	---	---	-------------	----		
Sutro-----------	0-10	18-25	0.6-2.0	0.10-0.12	6.6-7.3	<2	Moderate------	0.24	2	8
	10-39	18-25	0.6-2.0	0.12-0.14	6.6-7.3	<2	Moderate------	0.24		
	39	---	---	---	---	---	-------------	----		
571*:										
Kram------------	0-3	8-12	0.6-2.0	0.10-0.12	7.9-9.0	<2	Low-----------	0.32	1	7
	3-10	8-12	0.6-2.0	0.10-0.12	7.9-9.0	2-4	Low-----------	0.28		
	10	---	---	---	---	---	-------------	----		
Puett Variant---	0-8	10-15	0.6-2.0	0.10-0.12	7.9-8.4	<2	Low-----------	0.15	2	3
	8-28	10-15	2.0-6.0	0.06-0.08	7.9-8.4	<2	Low-----------	0.10		
	28	---	---	---	---	---	-------------	----		
581*:										
Loomer----------	0-3	13-20	0.6-2.0	0.05-0.08	6.6-7.8	<2	Low-----------	0.10	1	8
	3-17	40-55	0.06-0.2	0.04-0.10	6.6-7.8	<2	Moderate------	0.05		
	17	---	---	---	---	---	-------------	----		
Loomer----------	0-4	13-20	0.6-2.0	0.05-0.08	6.6-7.8	<2	Low-----------	0.10	1	8
	4-19	40-55	0.06-0.2	0.04-0.10	6.6-7.8	<2	Moderate------	0.05		
	19	---	---	---	---	---	-------------	----		
582*:										
Loomer----------	0-2	13-20	0.6-2.0	0.05-0.08	6.6-7.8	<2	Low-----------	0.10	1	8
	2-17	40-55	0.06-0.2	0.04-0.10	6.6-7.8	<2	Moderate------	0.05		
	17	---	---	---	---	---	-------------	----		
Olac------------	0-3	15-22	0.6-2.0	0.07-0.09	6.1-7.8	<2	Low-----------	0.10	1	8
	3-10	23-30	0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----------	0.05		
	10	---	---	---	---	---	-------------	----		
583*:										
Loomer----------	0-4	13-20	0.6-2.0	0.05-0.08	6.6-7.8	<2	Low-----------	0.10	1	8
	4-15	40-55	0.06-0.2	0.04-0.10	6.6-7.8	<2	Moderate------	0.05		
	15	---	---	---	---	---	-------------	----		
Zephan----------	0-2	10-15	0.6-2.0	0.11-0.13	5.6-6.5	<2	Low-----------	0.10	2	8
	2-37	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High----------	0.10		
	37	---	---	---	---	---	-------------	----		
Olac------------	0-4	15-22	0.6-2.0	0.07-0.09	6.1-7.8	<2	Low-----------	0.10	1	8
	4-14	23-30	0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----------	0.05		
	14	---	---	---	---	---	-------------	----		
591*:										
Minneha---------	0-7	6-15	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low-----------	0.10	1	8
	7-18	6-15	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low-----------	0.10		
	18	---	---	---	---	---	-------------	----		
Drit------------	0-15	7-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low-----------	0.10	5	8
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low-----------	0.10		
Glean-----------	0-8	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10	5	8
	8-30	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
	30-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low-----------	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
592*:										
Minneha	0-8	6-15	2.0-6.0	0.07-0.08	6.1-7.3	<2	Low	0.10	1	8
	8-15	6-15	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low	0.10		
	15	---	---	---	---	---	---	---		
Drit	0-15	7-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10	5	8
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10		
Rock outcrop.										
601 Mottsville	0-24	3-10	6.0-20	0.08-0.10	5.6-7.3	<2	Low	0.10	5	2
	24-60	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10		
602 Mottsville	0-18	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10	5	3
	18-60	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10		
603 Mottsville	0-24	2-8	6.0-20	0.05-0.07	5.6-7.3	<2	Low	0.10	5	8
	24-60	2-8	6.0-20	0.05-0.07	5.6-7.3	<2	Low	0.10		
604*:										
Mottsville	0-12	3-10	6.0-20	0.08-0.10	5.6-7.3	<2	Low	0.10	5	2
	12-60	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10		
Drit	0-15	7-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10	5	8
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10		
Roloc	0-6	7-10	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10	1	8
	6-15	10-18	0.6-2.0	0.06-0.07	6.1-7.3	<2	Low	0.10		
	15	---	---	---	---	---	---	---		
611 Nevador	0-9	5-15	2.0-6.0	0.10-0.14	6.6-7.3	<2	Low	0.24	5	3
	9-24	25-35	0.2-0.6	0.14-0.16	6.6-7.8	2-4	Moderate	0.32		
	24-60	5-15	2.0-6.0	0.11-0.13	7.4-9.0	2-4	Low	0.24		
612 Nevador	0-4	5-15	2.0-6.0	0.10-0.14	6.6-7.3	<2	Low	0.24	5	3
	4-24	25-35	0.2-0.6	0.14-0.16	6.6-7.8	2-4	Moderate	0.32		
	24-60	5-15	2.0-6.0	0.11-0.13	7.4-9.0	2-4	Low	0.24		
621 Niwot	0-15	18-25	0.6-2.0	0.16-0.18	6.6-7.3	<2	Moderate	0.32	1	5
	15-60	1-5	>20	0.04-0.07	6.6-7.3	<2	Low	0.10		
622 Niwot	0-12	28-35	0.6-2.0	0.16-0.18	6.6-7.8	<2	Moderate	0.32	1	6
	12-40	1-5	>20	0.04-0.07	6.6-7.8	<2	Low	0.10		
	40-60	45-55	0.06-0.2	0.14-0.16	6.6-7.8	<2	High	0.24		
631*:										
Olac	0-3	15-22	0.6-2.0	0.07-0.09	6.1-7.8	<2	Low	0.10	1	8
	3-10	23-30	0.6-2.0	0.05-0.07	6.1-7.8	<2	Low	0.05		
	10	---	---	---	---	---	---	---		
Ister	0-17	10-15	2.0-6.0	0.07-0.09	6.6-7.3	<2	Low	0.10	2	8
	17-38	25-35	0.2-0.6	0.09-0.14	6.6-7.8	<2	Moderate	0.10		
	38	---	---	---	---	---	---	---		
Rock outcrop.										

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
641, 642---------- Ophir	0-10	3-12	6.0-20	0.07-0.09	5.6-7.3	<2	Low-----------	0.15	4	4
	10-60	3-10	6.0-20	0.05-0.09	5.6-7.3	<2	Low-----------	0.15		
644--------------- Ophir Variant	0-7	---	>6.0	0.22-0.26	5.6-6.5	<2	Low-----------	0.00	5	8
	7-17	5-10	2.0-6.0	0.08-0.11	5.6-7.3	<2	Low-----------	0.15		
	17-60	3-10	2.0-6.0	0.07-0.11	5.6-7.3	<2	Low-----------	0.10		
651*: Oppio------------	0-5	8-18	2.0-6.0	0.07-0.09	7.4-7.8	<2	Low-----------	0.28	2	8
	5-30	40-50	0.06-0.2	0.14-0.16	7.4-7.8	<2	High----------	0.17		
	30	---	---	---	---	---	--------------	----		
Nosrac-----------	0-8	27-30	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate------	0.28	5	8
	8-35	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low-----------	0.32		
	35-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate------	0.28		
661--------------- Ormsby	0-16	3-7	6.0-20	0.05-0.07	6.6-7.3	2-4	Low-----------	0.15	5	2
	16-60	1-5	2.0-6.0	0.04-0.05	7.4-8.4	2-4	Low-----------	0.10		
662--------------- Ormsby	0-16	3-7	6.0-20	0.04-0.05	6.6-8.4	2-4	Low-----------	0.15	5	3
	16-60	1-5	2.0-6.0	0.04-0.05	7.4-8.4	2-4	Low-----------	0.10		
671*: Pernty-----------	0-5	18-25	0.6-2.0	0.11-0.13	6.6-7.3	<2	Low-----------	0.15	1	7
	5-15	25-35	0.2-0.6	0.08-0.10	6.6-7.3	<2	Moderate------	0.15		
	15	---	---	---	---	---	--------------	----		
Burnborough Variant---------	0-19	15-20	0.6-2.0	0.13-0.15	5.6-7.3	<2	Low-----------	0.24	2	6
	19-35	25-35	0.2-0.6	0.10-0.13	6.6-7.3	<2	Moderate------	0.24		
	35	---	---	---	---	---	--------------	----		
Chen-------------	0-5	15-25	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low-----------	0.24	1	8
	5-14	40-50	<0.06	0.05-0.06	6.1-7.3	<2	Moderate------	0.17		
	14	---	---	---	---	---	--------------	----		
672*: Pernty-----------	0-2	20-25	0.6-2.0	0.07-0.08	6.6-7.3	<2	Low-----------	0.15	1	8
	2-19	25-35	0.2-0.6	0.08-0.10	6.6-7.3	<2	Moderate------	0.15		
	19	---	---	---	---	---	--------------	----		
Burnborough------	0-10	10-25	0.6-2.0	0.10-0.13	6.1-7.3	<2	Moderate------	0.24	5	7
	10-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate------	0.28		
Glean------------	0-2	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low-----------	0.15	3	8
	2-23	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
	23-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low-----------	0.10		
673*: Pernty-----------	0-4	20-25	0.6-2.0	0.07-0.08	6.6-7.3	<2	Low-----------	0.15	1	8
	4-19	25-35	0.2-0.6	0.08-0.10	6.6-7.3	<2	Moderate------	0.15		
	19	---	---	---	---	---	--------------	----		
Burnborough------	0-7	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate------	0.10	5	8
	7-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate------	0.28		
Rock outcrop.										
681--------------- Phing	0-2	7-12	2.0-6.0	0.10-0.12	6.6-7.8	<2	Low-----------	0.32	5	3
	2-27	45-60	0.06-0.2	0.12-0.16	6.6-7.8	<2	High----------	0.20		
	27-60	25-45	0.2-0.6	0.15-0.19	7.4-8.4	<2	Moderate------	0.32		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
682------------- Phing	0-9	10-20	0.6-2.0	0.11-0.13	6.6-7.8	<2	Low----------	0.15	5	6
	9-31	45-60	0.06-0.2	0.12-0.16	6.6-8.4	<2	High---------	0.20		
	31-60	25-45	0.06-2.0	0.15-0.19	7.4-8.4	<2	Moderate-----	0.32		
683------------- Phing	0-4	15-25	0.6-2.0	0.13-0.15	6.6-7.8	<2	Moderate-----	0.24	5	6
	4-38	45-60	0.06-0.2	0.12-0.16	6.6-7.8	<2	High---------	0.20		
	38-60	25-45	0.2-0.6	0.15-0.19	7.4-8.4	<2	Moderate-----	0.32		
685*:										
Phing-----------	0-4	15-25	0.6-2.0	0.11-0.13	6.6-7.8	<2	Moderate-----	0.15	5	7
	4-28	45-60	0.06-0.2	0.12-0.16	6.6-7.8	<2	High---------	0.20		
	28-60	25-45	0.2-0.6	0.15-0.19	7.4-8.4	<2	Moderate-----	0.32		
Chalco----------	0-4	10-15	2.0-6.0	0.11-0.13	6.1-7.8	<2	Low----------	0.20	1	5
	4-17	40-60	<0.06	0.12-0.15	6.1-8.4	<2	High---------	0.24		
	17	---	---	---	---	---	-------------	----		
Uhaldi----------	0-8	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate-----	0.20	2	5
	8-35	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate-----	0.17		
	35	---	---	---	---	---	-------------	----		
691------------- Updike Variant	0-4	15-25	0.6-2.0	0.16-0.18	>8.4	4-8	Moderate-----	0.37	5	5
	4-41	25-35	0.2-0.6	0.19-0.21	>8.4	>16	Moderate-----	0.28		
	41-60	15-20	0.6-2.0	0.15-0.17	>9.0	4-8	Low----------	0.24		
693*:										
Updike Variant--	0-6	5-10	2.0-6.0	0.11-0.13	>8.4	4-8	Low----------	0.43	5	3
	6-19	25-35	0.2-0.6	0.19-0.21	>8.4	>16	Moderate-----	0.28		
	19-60	15-20	0.6-2.0	0.15-0.17	>9.0	4-8	Low----------	0.24		
Playas.										
702------------- Perazzo	0-4	14-20	0.6-2.0	0.07-0.10	6.6-7.8	<2	Low----------	0.10	3	7
	4-15	20-30	0.2-0.6	0.11-0.14	6.6-7.8	<2	Low----------	0.10		
	15-32	2-10	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low----------	0.02		
	32-60	0-4	6.0-20	0.02-0.04	>7.8	<2	Low----------	0.02		
712------------- Prey	0-13	2-7	6.0-20	0.06-0.07	6.1-7.3	<2	Low----------	0.17	3	3
	13-30	10-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.32		
	30-35	---	---	---	---	---	-------------	----		
	35-60	2-8	6.0-20	0.05-0.07	6.6-7.8	<2	Low----------	0.10		
713------------- Prey	0-9	10-15	2.0-6.0	0.11-0.13	6.1-7.3	<2	Low----------	0.20	5	3
	9-30	14-18	2.0-6.0	0.08-0.11	6.1-7.3	<2	Low----------	0.24		
	30-35	---	---	---	---	---	-------------	----		
	35-60	2-8	6.0-20	0.05-0.07	6.6-7.8	<2	Low----------	0.17		
721------------- Prey Variant	0-10	10-15	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low----------	0.28	5	6
	10-15	18-25	0.6-2.0	0.09-0.12	6.1-7.3	<2	Moderate-----	0.24		
	15-22	---	---	---	---	---	-------------	----		
	22-60	2-8	0.6-2.0	0.06-0.08	6.6-7.8	<2	Low----------	0.17		
731------------- Job Variant	0-7	5-15	0.6-2.0	0.10-0.12	7.9-8.4	>16	Low----------	0.49	5	6
	7-60	5-15	0.6-2.0	0.10-0.12	7.4-8.4	>16	Low----------	0.49		
741*:										
Puett-----------	0-3	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low----------	0.15	1	3
	3-10	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low----------	0.15		
	10	---	---	---	---	---	-------------	----		
Chalco----------	0-3	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low----------	0.10	1	7
	3-13	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High---------	0.24		
	13	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
741*:										
Chalco	0-4	10-15	2.0-6.0	0.11-0.13	6.1-7.8	<2	Low	0.20	1	5
	4-16	40-60	<0.06	0.12-0.15	6.1-8.4	<2	High	0.24		
	16	---	---	---	---	---	---	---		
742*:										
Puett	0-3	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15	1	3
	3-10	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15		
	10	---	---	---	---	---	---	---		
Chalco	0-4	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low	0.10	1	7
	4-15	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High	0.24		
	15	---	---	---	---	---	---	---		
Pula	0-2	18-24	0.6-2.0	0.07-0.09	6.6-7.3	<2	Moderate	0.10	5	8
	2-32	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate	0.10		
	32-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low	0.10		
743*:										
Puett	0-3	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15	1	3
	3-18	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15		
	18	---	---	---	---	---	---	---		
Verdico	0-4	20-25	0.6-2.0	0.09-0.10	6.6-7.3	<2	Moderate	0.17	2	8
	4-21	45-60	<0.06	0.13-0.15	6.6-7.8	<2	High	0.20		
	21-35	45-60	<0.06	0.12-0.17	6.6-7.8	<2	High	0.20		
	35	---	---	---	---	---	---	---		
Haybourne	0-6	8-15	0.6-2.0	0.15-0.17	6.6-7.8	<2	Low	0.37	5	5
	6-31	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low	0.28		
	31-60	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low	0.15		
744*:										
Puett	0-2	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15	1	3
	2-16	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15		
	16	---	---	---	---	---	---	---		
Verdico	0-3	20-25	0.6-2.0	0.09-0.10	6.6-7.3	<2	Moderate	0.17	2	8
	3-30	45-60	<0.06	0.13-0.15	6.6-7.8	<2	High	0.20		
	30	---	---	---	---	---	---	---		
Uhaldi	0-8	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate	0.20	2	5
	8-30	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate	0.17		
	30	---	---	---	---	---	---	---		
751*:										
Pula	0-4	18-24	0.6-2.0	0.07-0.09	6.6-7.3	<2	Moderate	0.10	5	8
	4-24	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate	0.10		
	24-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low	0.10		
Cassiro	0-8	10-20	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low	0.17	5	6
	8-42	40-50	0.2-0.6	0.05-0.06	6.1-7.3	<2	Moderate	0.10		
	42-60	15-30	0.6-2.0	0.09-0.10	6.6-7.8	<2	Moderate	0.10		
752*:										
Pula	0-4	18-24	0.6-2.0	0.07-0.09	6.6-7.3	<2	Moderate	0.10	5	8
	4-24	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate	0.10		
	24-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low	0.10		
Chalco	0-4	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low	0.10	1	7
	4-16	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High	0.24		
	16	---	---	---	---	---	---	---		
Pung	0-6	20-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate	0.17	5	6
	6-30	40-60	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.15		
	30-60	15-25	2.0-6.0	0.12-0.14	7.4-8.4	<2	Moderate	0.20		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
753*:										
Pula	0-5	18-24	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.10	5	8
	5-30	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate	0.10		
	30-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low	0.10		
Nosrac	0-9	10-15	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low	0.24	5	8
	9-40	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	40-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
Pung	0-8	20-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate	0.17	5	6
	8-32	40-60	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.15		
	32-60	15-25	2.0-6.0	0.12-0.14	7.4-8.4	<2	Moderate	0.20		
762*:										
Pulcan	0-5	13-18	0.6-2.0	0.05-0.07	6.1-7.3	<2	Low	0.10	3	8
	5-25	35-45	0.06-0.2	0.03-0.08	6.6-7.8	<2	Moderate	0.10		
	25-34	10-20	2.0-6.0	0.04-0.07	7.9-8.4	<2	Low	0.10		
	34	---	---	---	---	---	---	---		
Puett	0-3	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15	1	3
	3-16	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low	0.15		
	16	---	---	---	---	---	---	---		
Uhaldi	0-4	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate	0.20	2	5
	4-25	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate	0.17		
	25	---	---	---	---	---	---	---		
771 Rawe	0-5	6-12	2.0-6.0	0.09-0.11	6.6-8.4	<2	Low	0.37	5	4
	5-23	40-50	0.06-0.2	0.12-0.14	6.6-8.4	<2	High	0.24		
	23-60	5-8	2.0-6.0	0.05-0.08	>7.8	<4	Low	0.10		
772 Rawe	0-3	6-12	2.0-6.0	0.09-0.11	6.6-8.4	<2	Low	0.37	5	4
	3-23	40-50	0.06-0.2	0.12-0.14	6.6-8.4	<2	High	0.24		
	23-60	5-8	2.0-6.0	0.05-0.08	>7.8	<4	Low	0.10		
781 Reno	0-3	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	3-24	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	24-32	2-5	>20	0.05-0.07	6.6-7.8	<2	Low	0.10		
	32-44	---	---	---	---	---	---	---		
	44-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low	0.15		
782 Reno	0-6	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	6-24	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	24-34	---	---	---	---	---	---	---		
	34-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low	0.15		
783 Reno	0-2	20-25	0.6-2.0	0.10-0.13	5.6-7.3	<2	Moderate	0.17	2	8
	2-29	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High	0.17		
	29-39	---	---	---	---	<2	---	---		
	39-60	0-3	>20	0.03-0.05	6.6-8.4	---	Low	0.10		
784 Reno	0-3	27-35	0.2-0.6	0.16-0.18	6.1-7.3	<2	Moderate	0.32	2	7
	3-22	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	22-32	---	---	---	---	---	---	---		
	32-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low	0.15		
785*:										
Phing Variant	0-5	5-10	2.0-6.0	0.04-0.05	6.1-7.3	<2	Low	0.10	2	8
	5-27	45-60	<0.06	0.14-0.16	6.6-8.4	<4	High	0.17		
	27	---	---	---	---	---	---	---		
Reno	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	4-21	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	21-28	2-5	>20	0.05-0.07	6.6-7.8	<2	Low	0.10		
	28-35	---	---	---	---	---	---	---		
	35-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low	0.15		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
786*:										
Reno	0-2	20-25	0.6-2.0	0.10-0.13	5.6-7.3	<2	Moderate	0.17	2	8
	2-29	40-50	<0.06	0.14-0.16	6.1-7.8	<2	High	0.17		
	29-41	---	---	---	---	<2	---	---		
	41-60	0-3	>20	0.03-0.05	6.6-8.4	---	Low	0.10		
Phing	0-6	15-25	0.6-2.0	0.11-0.13	6.6-7.8	<2	Moderate	0.15	5	7
	6-34	45-60	0.06-0.2	0.12-0.16	6.6-7.8	<2	High	0.20		
	34-60	25-45	0.2-0.6	0.15-0.19	7.4-8.4	<2	Moderate	0.32		
Springmeyer	0-10	16-25	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate	0.32	5	3
	10-22	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate	0.20		
	22-60	18-25	0.2-2.0	0.11-0.13	6.6-8.4	<2	Moderate	0.20		
787*:										
Reno	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	4-36	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	36-60	---	---	---	---	---	---	---		
Saralegui	0-7	1-5	6.0-20	0.04-0.06	6.1-7.3	<2	Low	0.10	5	2
	7-31	10-15	2.0-6.0	0.09-0.12	6.6-7.8	<2	Low	0.17		
	31-60	2-5	6.0-20	0.06-0.08	6.6-9.0	<2	Low	0.10		
788*:										
Reno	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	4-32	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	32-36	---	---	---	---	---	---	---		
	36-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low	0.15		
Stucky	0-5	8-15	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low	0.10	5	8
	5-30	27-35	0.2-0.6	0.06-0.09	6.6-7.3	<2	Low	0.05		
	30-60	12-25	0.2-0.6	0.06-0.09	6.6-8.4	<2	Low	0.05		
789*:										
Phing Variant	0-2	5-10	2.0-6.0	0.04-0.05	6.1-7.3	<2	Low	0.10	2	8
	2-27	45-60	<0.06	0.14-0.16	7.9-8.4	<4	High	0.17		
	27	---	---	---	---	---	---	---		
Zephan	0-5	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low	0.15	2	4
	5-26	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High	0.10		
	26	---	---	---	---	---	---	---		
791 Risue	0-5	15-20	0.6-2.0	0.12-0.14	6.6-7.8	<2	Low	0.24	1	6
	5-18	35-50	0.06-0.2	0.14-0.17	6.6-8.4	<2	High	0.24		
	18-60	---	---	---	---	---	---	---		
792 Risue	0-3	15-20	0.6-2.0	0.04-0.06	6.6-7.8	<2	Low	0.15	1	8
	3-14	35-50	0.06-0.2	0.14-0.17	6.6-8.4	<2	High	0.24		
	14-60	---	---	---	---	---	---	---		
801*. Riverwash										
811*. Rock outcrop										
821*:										
Roloc	0-6	7-10	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10	1	8
	6-15	10-18	0.6-2.0	0.06-0.07	6.1-7.3	<2	Low	0.10		
	15	---	---	---	---	---	---	---		
Drit	0-15	7-15	2.0-6.0	0.10-0.12	6.6-7.3	<2	Low	0.10	5	5
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
831---------------- Saralegui	0-11	1-5	6.0-20	0.05-0.07	6.1-7.3	<2	Low------------	0.10	5	1
	11-28	10-15	2.0-6.0	0.09-0.12	6.6-7.8	<2	Low------------	0.17		
	28-60	2-5	6.0-20	0.06-0.08	6.6-9.0	<2	Low------------	0.10		
832---------------- Saralegui	0-11	1-5	6.0-20	0.05-0.07	6.1-7.3	<2	Low------------	0.10	5	1
	11-28	10-15	2.0-6.0	0.09-0.12	6.6-7.8	<2	Low------------	0.17		
	28-60	2-5	6.0-20	0.06-0.08	6.6-9.0	<2	Low------------	0.10		
833*:										
Saralegui--------	0-6	1-5	6.0-20	0.04-0.06	6.1-7.3	<2	Low------------	0.10	5	2
	6-29	10-15	2.0-6.0	0.09-0.12	6.6-7.8	<2	Low------------	0.17		
	29-60	2-5	6.0-20	0.06-0.08	6.6-9.0	<2	Low------------	0.10		
Saralegui--------	0-3	3-10	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low------------	0.20	5	3
	3-27	10-15	2.0-6.0	0.09-0.12	6.6-7.8	<2	Low------------	0.17		
	27-60	2-5	6.0-20	0.06-0.08	6.6-9.0	<2	Low------------	0.10		
834*:										
Saralegui--------	0-6	7-12	2.0-6.0	0.09-0.11	6.6-7.3	<2	Low------------	0.15	5	8
	6-30	10-15	2.0-6.0	0.09-0.11	6.6-7.8	<2	Low------------	0.15		
	30-60	3-10	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low------------	0.15		
Haybourne--------	0-12	5-15	2.0-6.0	0.08-0.11	6.6-7.8	<2	Low------------	0.24	5	3
	12-22	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low------------	0.28		
	22-60	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low------------	0.15		
Reno-------------	0-3	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate------	0.17	2	8
	3-35	40-50	<0.06	0.14-0.16	6.1-7.8	<2	High-----------	0.17		
	35-43	---	---	---	---	<2	---------------	----		
	43-60	0-3	>20	0.03-0.05	6.6-8.4	---	Low------------	0.10		
841*:										
Searles----------	0-14	18-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low------------	0.24	2	8
	14-31	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Low------------	0.20		
	31	---	---	---	---	---	---------------	----		
Devada-----------	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate------	0.15	1	8
	4-14	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High-----------	0.17		
	14	---	---	---	---	---	---------------	----		
Duco-------------	0-6	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low------------	0.24	1	8
	6-18	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate------	0.24		
	18	---	---	---	---	---	---------------	----		
842*:										
Searles----------	0-6	18-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low------------	0.24	2	8
	6-36	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Low------------	0.20		
	36	---	---	---	---	---	---------------	----		
Burnborough------	0-9	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate------	0.10	5	8
	9-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate------	0.28		
Duco-------------	0-4	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low------------	0.24	1	8
	4-18	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate------	0.24		
	18	---	---	---	---	---	---------------	----		
843*:										
Searles----------	0-6	18-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low------------	0.24	2	8
	6-27	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Low------------	0.20		
	27	---	---	---	---	---	---------------	----		
Burnborough------	0-14	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate------	0.10	5	8
	14-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate------	0.28		
Chen-------------	0-7	15-25	0.6-2.0	0.07-0.08	6.1-7.3	<2	Low------------	0.24	1	8
	7-18	40-50	<0.06	0.05-0.06	6.1-7.3	<2	Moderate------	0.17		
	18	---	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
851----------------- Settlemeyer	0-15	27-35	0.2-0.6	0.16-0.18	7.9-9.0	<4	Moderate-----	0.37	5	5
	15-35	27-35	0.2-0.6	0.16-0.19	7.9-8.4	4-8	Moderate-----	0.37		
	35-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	4-8	Low----------	0.24		
852----------------- Settlemeyer	0-15	27-35	0.2-0.6	0.16-0.18	>7.3	<4	Moderate-----	0.37	5	5
	15-35	27-35	0.2-0.6	0.16-0.19	>7.3	<4	Moderate-----	0.37		
	35-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<4	Low----------	0.24		
854----------------- Settlemeyer	0-12	15-25	0.6-2.0	0.16-0.17	>7.3	<4	Moderate-----	0.37	5	5
	12-30	27-35	0.2-0.6	0.16-0.19	>7.3	<4	Moderate-----	0.37		
	30-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<4	Low----------	0.24		
861----------------- Shakespeare	0-6	10-15	0.6-2.0	0.12-0.14	5.6-6.5	<2	Low----------	0.24	5	8
	6-37	25-35	0.06-0.2	0.11-0.14	5.6-6.5	<2	Moderate-----	0.10		
	37-60	25-30	0.2-0.6	0.10-0.15	5.6-7.3	<2	Moderate-----	0.17		
871----------------- Shree	0-10	15-25	0.6-6.0	0.10-0.12	6.1-7.8	<2	Low----------	0.10	5	8
	10-26	27-35	0.2-0.6	0.06-0.09	6.6-7.8	<2	Moderate-----	0.10		
	26-60	10-25	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low----------	0.15		
872----------------- Shree	0-8	15-25	0.6-2.0	0.13-0.14	6.1-7.8	<2	Low----------	0.20	5	8
	8-36	27-35	0.2-0.6	0.06-0.09	6.6-7.8	<2	Moderate-----	0.10		
	36-60	10-25	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low----------	0.15		
873*:										
Shree-------------	0-7	15-25	0.6-6.0	0.10-0.12	6.1-7.8	<2	Low----------	0.10	5	8
	7-26	27-35	0.2-0.6	0.06-0.09	6.6-7.8	<2	Moderate-----	0.10		
	26-60	10-25	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low----------	0.15		
Settlemeyer-------	0-12	15-25	0.6-2.0	0.16-0.17	>7.3	<4	Moderate-----	0.37	5	5
	12-38	27-35	0.2-0.6	0.16-0.19	>7.3	<8	Moderate-----	0.37		
	38-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<8	Low----------	0.24		
874*:										
Shree-------------	0-6	15-25	0.6-2.0	0.13-0.14	6.1-7.8	<2	Low----------	0.20	5	8
	6-31	27-35	0.2-0.6	0.06-0.09	6.6-7.8	<2	Moderate-----	0.10		
	31-60	10-25	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low----------	0.15		
Pung--------------	0-6	20-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate-----	0.17	5	6
	6-30	40-60	0.06-0.2	0.14-0.16	6.6-7.3	<2	High---------	0.15		
	30-60	15-25	2.0-6.0	0.12-0.14	7.4-8.4	<2	Moderate-----	0.20		
881----------------- Springmeyer	0-10	16-25	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate-----	0.32	5	3
	10-22	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	22-60	18-25	0.2-2.0	0.11-0.13	6.6-8.4	<2	Moderate-----	0.20		
882----------------- Springmeyer	0-10	18-25	0.2-2.0	0.15-0.16	6.1-7.3	<2	Moderate-----	0.32	5	5
	10-22	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	22-60	22-30	0.2-2.0	0.10-0.13	6.6-8.4	<2	Moderate-----	0.20		
883----------------- Springmeyer	0-10	10-16	2.0-6.0	0.08-0.11	6.1-7.3	<2	Low----------	0.17	5	5
	10-22	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	22-60	22-30	0.2-2.0	0.10-0.13	6.6-8.4	<2	Moderate-----	0.20		
884----------------- Springmeyer	0-10	16-25	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate-----	0.32	5	3
	10-28	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	28-60	18-25	0.2-2.0	0.11-0.13	6.6-8.4	<2	Moderate-----	0.20		
891----------------- Stodick	0-3	10-15	0.2-2.0	0.10-0.13	6.1-7.3	<2	Low----------	0.24	2	5
	3-18	25-35	0.2-0.6	0.13-0.17	6.1-7.3	<2	Moderate-----	0.32		
	18	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
892*:										
Stodick	0-2	10-20	0.2-2.0	0.14-0.18	6.1-7.3	<2	Low	0.32	2	7
	2-16	25-35	0.2-0.6	0.13-0.17	6.1-7.3	<2	Moderate	0.32		
	16	---	---	---	---	---	---	----		
Indiano	0-10	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.32	3	4
	10-34	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate	0.28		
	34	---	---	---	---	---	---	----		
901*:										
Surgem	0-8	10-15	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low	0.10	2	8
	8-24	35-50	0.06-0.2	0.10-0.12	6.1-7.8	<2	Moderate	0.20		
	24	---	---	---	---	---	---	----		
Olac	0-2	15-22	0.6-2.0	0.07-0.09	6.1-7.8	<2	Low	0.10	1	8
	2-10	23-30	0.6-2.0	0.05-0.07	6.1-7.8	<2	Low	0.05		
	10	---	---	---	---	---	---	----		
Cagle	0-4	22-26	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24	3	8
	4-28	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.24		
	28-36	30-55	0.06-0.2	0.07-0.09	6.1-7.8	<2	Moderate	0.24		
	36	---	---	---	---	---	---	----		
911:										
Theon	0-2	10-20	2.0-6.0	0.06-0.09	6.6-8.4	<2	Low	0.05	1	8
	2-13	25-35	0.2-0.6	0.06-0.09	6.6-9.0	<2	Low	0.15		
	13-18	---	---	---	---	---	---	----		
	18	---	---	---	---	---	---	----		
912:										
Theon	0-2	10-20	2.0-6.0	0.06-0.09	6.6-8.4	<2	Low	0.05	1	8
	2-13	25-35	0.2-0.6	0.06-0.09	6.6-9.0	<2	Low	0.15		
	13	---	---	---	---	---	---	----		
921 Nevador Variant	0-8	10-20	0.6-2.0	0.14-0.17	7.4-8.4	<2	Low	0.24	2	3
	8-22	20-35	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate	0.20		
	22	---	---	---	---	---	---	----		
922 Nevador Variant	0-8	10-20	0.6-2.0	0.14-0.17	7.4-8.4	<2	Low	0.24	2	3
	8-26	20-35	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate	0.20		
	26-60	---	---	---	---	---	---	----		
923 Nevador Variant	0-4	10-20	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low	0.10	2	6
	4-23	20-35	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate	0.20		
	23-60	---	---	---	---	---	---	----		
931*:										
Temo	0-6	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low	0.15	1	5
	6-9	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low	0.17		
	9	---	---	---	---	---	---	----		
Rock outcrop.										
932*:										
Temo	0-10	2-8	6.0-20	0.03-0.05	5.6-6.5	<2	Low	0.05	1	8
	10-16	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low	0.17		
	16	---	---	---	---	---	---	----		
Rock outcrop.										
941*:										
Toiyabe	0-7	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10	1	3
	7-15	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10		
	15	---	---	---	---	---	---	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
941*: Rock outcrop.										
942*: Toiyabe	0-6	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10	1	3
	6-17	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low	0.10		
	17	---	---	---	---	---	---	---		
Rock outcrop.										
951, 952 Toll	0-4	1-5	>20	0.06-0.08	6.1-6.5	<2	Low	0.10	5	1
	4-54	2-8	6.0-20	0.09-0.10	6.6-7.3	<2	Low	0.15		
	54-60	2-8	>20	0.04-0.06	6.6-7.3	<2	Low	0.10		
953 Toll	0-4	1-5	>20	0.04-0.06	6.1-6.5	<2	Low	0.10	5	1
	4-43	2-8	6.0-20	0.05-0.07	6.6-7.3	<2	Low	0.15		
	43-60	35-50	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.24		
961*: Burnborough	0-14	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate	0.10	5	8
	14-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate	0.28		
Glean	0-19	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low	0.15	3	8
	19-60	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
962*: Burnborough	0-10	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate	0.10	5	8
	10-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate	0.28		
Pernty	0-4	20-25	0.6-2.0	0.07-0.08	6.6-7.3	<2	Low	0.15	1	8
	4-19	25-35	0.2-0.6	0.08-0.10	6.6-7.3	<2	Moderate	0.15		
	19	---	---	---	---	---	---	---		
Glean	0-23	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low	0.15	3	8
	23-60	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
963*: Burnborough	0-10	10-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Moderate	0.10	5	8
	10-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate	0.28		
Sup	0-12	7-15	0.6-2.0	0.09-0.11	5.6-6.5	<2	Low	0.10	5	8
	12-60	5-15	2.0-6.0	0.05-0.07	5.6-6.5	<2	Low	0.05		
Chen	0-5	15-25	0.6-2.0	0.08-0.09	6.1-7.3	<2	Low	0.20	1	8
	5-15	40-50	<0.06	0.05-0.06	6.1-7.3	<2	Moderate	0.17		
	15	---	---	---	---	---	---	---		
972*: Trid	0-5	7-10	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.20	2	3
	5-32	25-30	0.2-0.6	0.08-0.09	6.6-7.3	<2	Moderate	0.10		
	32	---	---	---	---	---	---	---		
Trid	0-8	1-3	6.0-20	0.04-0.06	6.6-7.3	<2	Low	0.15	2	1
	8-31	25-30	0.2-0.6	0.08-0.09	6.6-7.3	<2	Moderate	0.10		
	31	---	---	---	---	---	---	---		
Drit	0-8	7-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low	0.15	5	3
	8-15	7-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10		
	15-60	8-18	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low	0.10		
973*: Trid	0-6	18-25	0.6-2.0	0.08-0.09	6.6-7.3	<2	Moderate	0.15	2	5
	6-34	25-30	0.2-0.6	0.04-0.06	6.6-7.3	<2	Moderate	0.10		
	34	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
973*:										
Drit	0-15	7-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10	5	8
	15-60	10-18	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10		
Duco	0-4	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.24	1	8
	4-14	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	14	---	---	---	---	---	-------------	----		
974*:										
Trid	0-6	18-25	0.6-2.0	0.08-0.09	6.6-7.3	<2	Moderate	0.15	2	5
	6-34	25-30	0.2-0.6	0.04-0.06	6.6-7.3	<2	Moderate	0.10		
	34	---	---	---	---	---	-------------	----		
Roloc	0-9	7-10	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10	1	8
	9-18	10-18	0.6-2.0	0.06-0.07	6.1-7.3	<2	Low	0.10		
	18	---	---	---	---	---	-------------	----		
Drit	0-8	7-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low	0.15	5	3
	8-15	7-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10		
	15-60	8-18	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low	0.10		
975*:										
Trid	0-8	18-25	0.6-2.0	0.08-0.09	6.6-7.3	<2	Moderate	0.15	2	5
	8-26	25-30	0.2-0.6	0.04-0.06	6.6-7.3	<2	Moderate	0.10		
	26	---	---	---	---	---	-------------	----		
Roloc	0-9	7-10	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.10	1	8
	9-15	10-18	0.6-2.0	0.06-0.07	6.1-7.3	<2	Low	0.10		
	15	---	---	---	---	---	-------------	----		
Glean	0-6	8-18	2.0-6.0	0.07-0.11	6.1-7.3	<2	Low	0.15	3	8
	6-30	8-18	2.0-6.0	0.06-0.10	6.1-7.3	<2	Low	0.10		
	30-60	8-18	2.0-6.0	0.06-0.09	6.1-7.3	<2	Low	0.10		
976*:										
Trid	0-11	7-13	2.0-6.0	0.04-0.05	6.6-7.3	<2	Low	0.15	2	3
	11-30	25-30	0.2-0.6	0.04-0.06	6.6-7.3	<2	Moderate	0.10		
	30	---	---	---	---	---	-------------	----		
Roloc	0-6	3-8	2.0-6.0	0.07-0.08	6.6-7.3	<2	Low	0.10	1	8
	6-14	10-18	0.6-2.0	0.06-0.07	6.6-7.3	<2	Low	0.10		
	14	---	---	---	---	---	-------------	----		
Mottsville	0-16	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10	5	3
	16-60	3-10	6.0-20	0.06-0.08	5.6-7.3	<2	Low	0.10		
977*:										
Trid	0-11	18-25	0.6-2.0	0.08-0.09	6.6-7.3	<2	Moderate	0.15	2	5
	11-34	25-30	0.2-0.6	0.04-0.06	6.6-7.3	<2	Moderate	0.10		
	34	---	---	---	---	---	-------------	----		
Roloc	0-9	3-8	2.0-6.0	0.07-0.08	6.6-7.3	<2	Low	0.10	1	8
	9-16	10-18	0.6-2.0	0.06-0.07	6.6-7.3	<2	Low	0.10		
	16	---	---	---	---	---	-------------	----		
Sup	0-12	5-15	2.0-6.0	0.08-0.10	5.6-6.5	<2	Low	0.10	5	8
	12-60	5-15	2.0-6.0	0.05-0.07	5.6-6.5	<2	Low	0.05		
982 Turria	0-2	15-25	0.6-2.0	0.16-0.18	6.1-7.8	<2	Moderate	0.37	5	5
	2-12	25-35	0.2-0.6	0.17-0.20	6.1-7.8	<2	Moderate	0.32		
	12-60	15-25	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.49		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
985------------- Turria	0-6	27-30	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate-----	0.37	5	6
	6-18	25-35	0.2-0.6	0.17-0.20	6.6-7.3	<2	Moderate-----	0.37		
	18-60	15-25	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate-----	0.49		
986------------- Turria	0-7	27-30	0.2-0.6	0.19-0.21	6.1-7.8	<2	Moderate-----	0.28	5	6
	7-19	25-35	0.2-0.6	0.17-0.20	6.1-7.8	<2	Moderate-----	0.32		
	19-60	15-25	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate-----	0.49		
992------------- Updike	0-2	27-37	0.06-0.2	0.19-0.21	8.5-9.0	8-16	Moderate-----	0.43	5	7
	2-41	35-50	<0.06	0.15-0.17	>8.4	>16	High---------	0.49		
	41-60	2-8	6.0-20	0.05-0.06	7.9-9.0	>16	Low----------	0.15		
993*: Updike----------	0-2	27-37	0.06-0.2	0.19-0.21	7.9-8.4	<2	Moderate-----	0.43	5	7
	2-30	35-50	<0.06	0.15-0.17	7.9-9.0	<4	High---------	0.49		
	30-60	20-35	0.2-0.6	0.14-0.16	7.9-9.0	<4	Moderate-----	0.24		
Springmeyer------	0-8	20-27	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate-----	0.43	5	6
	8-30	25-35	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate-----	0.37		
	30-60	20-30	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate-----	0.37		
994------------- Updike	0-2	27-37	0.06-0.2	0.19-0.21	8.5-9.0	>8	Moderate-----	0.43	5	7
	2-41	35-50	<0.06	0.15-0.17	>8.4	>8	High---------	0.49		
	41-60	2-8	6.0-20	0.05-0.06	7.9-9.0	>8	Low----------	0.15		
1011*: Verdico---------	0-3	20-25	0.6-2.0	0.09-0.10	6.6-7.3	<2	Moderate-----	0.17	2	8
	3-30	45-60	<0.06	0.13-0.15	6.6-7.8	<2	High---------	0.20		
	30-60	---	---	---	---	---	-------------	----		
Puett-----------	0-2	15-20	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low----------	0.15	1	3
	2-18	3-10	2.0-6.0	0.09-0.10	7.9-8.4	<2	Low----------	0.15		
	18	---	---	---	---	---	-------------	----		
1012*: Verdico---------	0-4	20-25	0.6-2.0	0.13-0.14	6.1-7.3	<2	Moderate-----	0.28	2	6
	4-35	45-60	<0.06	0.13-0.15	6.1-7.8	<2	High---------	0.20		
	35-60	---	---	---	---	---	-------------	----		
Uhaldi----------	0-5	20-25	0.6-2.0	0.06-0.08	5.6-7.3	<2	Moderate-----	0.05	2	8
	5-24	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate-----	0.17		
	24	---	---	---	---	---	-------------	----		
Springmeyer------	0-10	16-25	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate-----	0.32	5	3
	10-25	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	25-60	18-25	0.2-2.0	0.11-0.13	6.6-8.4	<2	Moderate-----	0.20		
1021------------ Veta	0-3	5-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low----------	0.10	5	5
	3-18	5-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low----------	0.10		
	18-60	2-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low----------	0.10		
1031*: Vicee-----------	0-13	12-18	0.6-2.0	0.14-0.17	6.6-7.3	<2	Low----------	0.24	5	4
	13-60	12-18	0.6-2.0	0.14-0.17	6.6-7.3	<2	Low----------	0.24		
Rock outcrop.										
1041------------ Voltaire	0-20	28-35	0.2-0.6	0.13-0.14	>7.8	>16	Moderate-----	0.43	5	7
	20-60	25-35	0.06-0.2	0.16-0.18	7.9-9.0	4-8	Moderate-----	0.37		
1042------------ Voltaire	0-20	40-45	0.06-0.2	0.15-0.17	7.9-8.4	2-4	High---------	0.32	5	4
	20-60	20-30	0.06-0.2	0.16-0.18	7.9-9.0	4-8	Moderate-----	0.37		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1044------------- Voltaire	0-20	40-45	0.06-0.2	0.14-0.16	8.5-9.0	4-8	High----------	0.28	5	4
	20-60	20-30	0.06-0.2	0.16-0.18	7.9-9.0	2-8	Moderate------	0.37		
1051------------- Voltaire Variant	0-6	30-35	0.2-0.6	0.19-0.21	>9.0	>16	Moderate------	0.28	5	6
	6-25	40-45	0.06-0.2	0.15-0.17	>9.0	>16	High----------	0.24		
	25-60	15-25	0.6-2.0	0.19-0.21	8.5-9.0	>8	Moderate------	0.49		
1061------------- Washoe	0-11	5-15	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.15	5	4
	11-42	18-27	0.2-0.6	0.10-0.14	6.1-7.3	<2	Moderate------	0.20		
	42-60	5-10	>20	0.04-0.06	6.1-7.3	<2	Low-----------	0.10		
1062------------- Washoe	0-5	10-20	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.15	3	8
	5-35	18-27	0.2-0.6	0.07-0.10	6.1-7.3	<2	Moderate------	0.17		
	35-60	3-10	>20	0.03-0.05	6.1-7.3	<2	Low-----------	0.10		
1063------------- Washoe	0-11	5-15	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.10	5	5
	11-42	18-27	0.2-0.6	0.10-0.14	6.1-7.3	<2	Moderate------	0.20		
	42-60	5-10	>20	0.04-0.06	6.1-7.3	<2	Low-----------	0.10		
1066*:										
Washoe----------	0-7	5-15	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.10	5	5
	7-32	18-27	0.2-0.6	0.10-0.14	6.1-7.3	<2	Moderate------	0.20		
	32-60	5-10	>20	0.04-0.06	6.1-7.3	<2	Low-----------	0.10		
Reno------------	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----------	0.17	2	4
	4-31	35-60	<0.06	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	31-44	---	---	---	---	---	--------------	----		
	44-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low-----------	0.15		
1071------------- Corbett	0-3	1-5	6.0-20	0.06-0.08	5.6-6.5	<2	Low-----------	0.10	2	4
	3-24	1-5	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.10		
	24	---	---	---	---	---	--------------	----		
1072*:										
Corbett---------	0-3	1-5	6.0-20	0.07-0.09	5.6-6.5	<2	Low-----------	0.17	2	2
	3-24	1-5	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.10		
	24	---	---	---	---	---	--------------	----		
Toiyabe---------	0-7	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10	1	3
	7-15	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10		
	15	---	---	---	---	---	--------------	----		
1073*:										
Corbett---------	0-7	1-5	6.0-20	0.07-0.09	5.6-6.5	<2	Low-----------	0.17	2	2
	7-38	1-5	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.10		
	38	---	---	---	---	---	--------------	----		
Toiyabe---------	0-7	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	1	3
	7-14	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10		
	14	---	---	---	---	---	--------------	----		
1081*:										
Zephan----------	0-5	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low-----------	0.15	2	4
	5-26	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High----------	0.10		
	26	---	---	---	---	---	--------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1081*:										
Zephan	0-3	10-15	2.0-6.0	0.10-0.12	5.6-6.5	<2	Low	0.15	2	4
	3-29	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High	0.10		
	29	---	---	---	---	---	---	----		
1091*:										
Uhaldi	0-5	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate	0.20	2	5
	5-24	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate	0.17		
	24	---	---	---	---	---	---	----		
Nosrac	0-13	18-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.28	5	8
	13-34	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	34-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
1101*:										
Pung	0-6	20-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate	0.17	5	6
	6-30	40-60	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.15		
	30-60	15-25	2.0-6.0	0.12-0.14	7.4-8.4	<2	Moderate	0.20		
Phing	0-2	15-25	0.6-2.0	0.11-0.13	6.6-7.8	<2	Moderate	0.15	5	7
	2-32	45-60	0.06-0.2	0.12-0.16	6.6-7.8	<2	High	0.20		
	32-60	25-45	0.2-0.6	0.15-0.19	7.4-8.4	<2	Moderate	0.32		
Chalco	0-4	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low	0.10	1	7
	4-17	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High	0.24		
	17	---	---	---	---	---	---	----		
1102*:										
Pung	0-6	20-25	0.6-2.0	0.14-0.16	6.6-7.3	<2	Moderate	0.17	5	6
	6-30	40-60	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.15		
	30-60	15-25	2.0-6.0	0.12-0.14	7.4-8.4	<2	Moderate	0.20		
Pula	0-5	18-24	0.6-2.0	0.07-0.09	6.6-7.3	<2	Moderate	0.10	5	8
	5-30	35-45	0.06-0.2	0.06-0.07	6.6-7.3	<2	Moderate	0.10		
	30-60	10-25	2.0-6.0	0.03-0.05	6.6-7.3	<2	Low	0.10		
Uhaldi	0-10	20-25	0.6-2.0	0.12-0.14	5.6-7.3	<2	Moderate	0.20	2	5
	10-35	27-35	0.2-0.6	0.16-0.17	6.1-7.3	<2	Moderate	0.17		
	35	---	---	---	---	---	---	----		
1111 Stucky	0-8	8-15	0.6-2.0	0.05-0.17	6.6-7.3	<2	Low	0.05	5	8
	8-28	27-35	0.2-0.6	0.06-0.09	6.6-7.3	<2	Low	0.05		
	28-60	12-25	0.2-0.6	0.06-0.09	6.6-8.4	<2	Low	0.05		
1112*:										
Stucky	0-3	8-15	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low	0.10	5	8
	3-21	27-35	0.2-0.6	0.06-0.09	6.6-7.3	<2	Low	0.05		
	21-60	12-25	0.2-0.6	0.06-0.09	6.6-8.4	<2	Low	0.05		
Stucky	0-5	8-15	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low	0.10	5	8
	5-25	27-35	0.2-0.6	0.06-0.09	6.6-7.3	<2	Low	0.05		
	25-60	12-25	0.2-0.6	0.06-0.09	6.6-8.4	<2	Low	0.05		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
101-- Aldax	D	None	---	---	>6.0	---	---
102*:							
Aldax	D	None	---	---	>6.0	---	---
Indiano	C	None	---	---	>6.0	---	---
111-- Borda	D	None	---	---	>6.0	---	---
121*:							
Borda Variant	C	None	---	---	>6.0	---	---
Genoa	D	None	---	---	>6.0	---	---
Burnborough Variant	B	None	---	---	>6.0	---	---
122*:							
Borda Variant	C	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
123*:							
Borda Variant	C	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
Chen	D	None	---	---	>6.0	---	---
124*:							
Borda Variant	C	None	---	---	>6.0	---	---
Burnborough Variant	B	None	---	---	>6.0	---	---
Cassiro	C	None	---	---	>6.0	---	---
141-- Brockliss	D	Occasional	Brief	Dec-Mar	4.0-6.0	Apparent	Dec-May
151*:							
Cagle	D	None	---	---	>6.0	---	---
Deven	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
152*:							
Cagle	D	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
153*:							
Cagle	D	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
Rock outcrop.							
154*:							
Cagle	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth (Ft)	High water table: Kind	High water table: Months
154*:							
Nosrac	B	None	---	---	>6.0	---	---
155*:							
Cagle	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
Borda	D	None	---	---	>6.0	---	---
156*:							
Cagle	D	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
Rock outcrop.							
161*, 162*, 163*, 164*:							
Witefels	B	None	---	---	>6.0	---	---
Rock outcrop.							
165*:							
Witefels	B	None	---	---	>6.0	---	---
Temo	C	None	---	---	>6.0	---	---
181*:							
Chalco	D	None	---	---	>6.0	---	---
182*:							
Chalco	D	None	---	---	>6.0	---	---
Pula	C	None	---	---	>6.0	---	---
183*:							
Chalco	D	None	---	---	>6.0	---	---
191, 192 Cradlebaugh	D	Occasional	Brief	Dec-Mar	3.0-4.0	Apparent	Feb-May
193, 194 Cradlebaugh	D	Occasional	Brief	Dec-Mar	2.0-3.0	Apparent	Feb-Jun
201 Dangberg	D	None	---	---	>6.0	---	---
202, 203 Dangberg	D	Rare	---	---	2.0-3.0	Artesian	Dec-May
204, 205 Dangberg	D	Occasional	Brief	Dec-Mar	1.0-2.0	Artesian	Dec-May
211*:							
Devada	D	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
212*:							
Devada	D	None	---	---	>6.0	---	---
Koontz	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
213*:							
Devada	D	None	---	---	>6.0	---	---
Burnborough Variant	B	None	---	---	>6.0	---	---
214*:							
Devada	D	None	---	---	>6.0	---	---
Rock outcrop.							
221 East Fork Variant	C	Rare	---	---	4.0-5.0	Apparent	Dec-Jun
231*:							
Brockliss Variant	B	Rare	---	---	5.0-6.0	Apparent	Mar-Jun
Brockliss Variant	B	Rare	---	---	3.5-5.0	Apparent	Mar-Jun
Dangberg	D	None	---	---	>6.0	---	---
241 Dressler	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
242 Dressler	C	Occasional	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-May
251*:							
Duco	D	None	---	---	>6.0	---	---
Cagle	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
252*:							
Duco	D	None	---	---	>6.0	---	---
Devada	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
253*:							
Duco	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
254*:							
Duco	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
Burnborough Variant	B	None	---	---	>6.0	---	---
255*:							
Duco	D	None	---	---	>6.0	---	---
Searles	C	None	---	---	>6.0	---	---
261*:							
Dumps.							
Pits.							
271, 272 East Fork	C	Rare	---	---	3.5-5.0	Apparent	Dec-May

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
281, 282 Fettic	D	Occasional	Brief	Dec-Mar	3.5-5.0	Apparent	Dec-May
292*: Vicee Variant	C	None	---	---	>6.0	---	---
Rock outcrop.							
301*: Franktown	D	None	---	---	>6.0	---	---
Rubble land.							
Rock outcrop.							
311 Gardnerville	C	Rare	---	---	4.0-5.0	Apparent	Dec-May
312 Gardnerville	C	Rare	---	---	>6.0	---	---
313, 314, 315 Gardnerville	C	Rare	---	---	4.0-5.0	Apparent	Dec-May
321*: Genoa	D	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
322*: Genoa	D	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
Rock outcrop.							
331*: Glean	B	None	---	---	>6.0	---	---
Genoa	D	None	---	---	>6.0	---	---
332*: Glean	B	None	---	---	>6.0	---	---
Genoa	D	None	---	---	>6.0	---	---
Rubble land.							
334*: Glean	B	None	---	---	>6.0	---	---
Sup	B	None	---	---	>6.0	---	---
Genoa	D	None	---	---	>6.0	---	---
341*: Glenbrook	D	None	---	---	>6.0	---	---
342*: Glenbrook	D	None	---	---	>6.0	---	---
Rock outcrop.							
351 Godecke	D	Rare	---	---	3.5-5.0	Apparent	Dec-May

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
362*, 363*:							
Gralic	B	None	---	---	>6.0	---	---
Rock outcrop.							
371, 372 Graylock	B	None	---	---	>6.0	---	---
381, 382 Greenbrae	C	None	---	---	>6.0	---	---
391, 392, 393, 394 Haybourne	B	Rare	---	---	>6.0	---	---
401 Heidtman	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
402 Heidtman	C	Occasional	Brief	Dec-Mar	4.0-5.0	Apparent	Dec-May
411 Henningsen	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
412 Henningsen	C	Frequent	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-May
413 Henningsen	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
414 Henningsen	C	Frequent	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-May
422 Henningsen Variant	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
431* Shalcar family	D	Frequent	Long	Dec-Mar	+2-1.5	Apparent	Jan-Dec
442, 443 Holbrook	B	Rare	---	---	>6.0	---	---
444*:							
Holbrook	B	Rare	---	---	>6.0	---	---
Glenbrook	D	None	---	---	>6.0	---	---
445*:							
Holbrook	B	Rare	---	---	>6.0	---	---
Greenbrae	C	None	---	---	>6.0	---	---
Reno	D	None	---	---	>6.0	---	---
446*:							
Holbrook	B	Rare	---	---	>6.0	---	---
Verdico	D	None	---	---	>6.0	---	---
451*:							
Hyloc	D	None	---	---	>6.0	---	---
Ister	C	None	---	---	>6.0	---	---
461 Hussman	D	Occasional	Brief	Dec-Mar	2.5-4.0	Apparent	Dec-May

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
462, 463 Hussman	D	Rare	---	---	2.5-4.0	Apparent	Dec-May
471 Incy	A	None	---	---	>6.0	---	---
481, 482, 483 Indian Creek	D	None	---	---	>6.0	---	---
485*:							
Indian Creek	D	None	---	---	>6.0	---	---
Haybourne	B	Rare	---	---	>6.0	---	---
486*:							
Indian Creek	D	None	---	---	>6.0	---	---
Reno	D	None	---	---	>6.0	---	---
Cassiro	C	None	---	---	>6.0	---	---
487*:							
Indian Creek Variant	D	None	---	---	>6.0	---	---
Cassiro	C	None	---	---	>6.0	---	---
Puett	D	None	---	---	>6.0	---	---
488*:							
Indian Creek Variant	D	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
491 Indiano	C	None	---	---	>6.0	---	---
501, 502 James Canyon	B	None	---	---	4.0-6.0	Apparent	Dec-May
503 Kimmerling Variant	D	Rare	---	---	0-1.0	Artesian	Dec-May
511 James Canyon Variant	C	None	---	---	1.5-3.0	Apparent	Dec-Jun
512 James Canyon Variant	C	None	---	---	3.0-5.0	Apparent	Dec-Jun
521 Job	C	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-May
523 Job	C	Occasional	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-Jun
524 Job	D	Occasional	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-May
531 Jubilee	C	Rare	---	---	1.0-2.0	Apparent	Dec-May
532 Jubilee	D	Occasional	Brief	Dec-Mar	1.0-2.0	Apparent	Dec-Jun
533 Jubilee Variant	D	Occasional	Brief	Dec-Mar	0-1.0	Apparent	Dec-Jun

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
534*:							
Jubilee	D	Occasional	Brief	Dec-Mar	1.0-2.0	Apparent	Dec-Jun
Dressler	C	Occasional	Brief	Dec-Mar	2.0-3.0	Apparent	Dec-May
Kimmerling	D	Occasional	Brief	Dec-Mar	1.0-2.0	Apparent	Dec-May
541*:							
Softscrabble	C	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
Genoa	D	None	---	---	>6.0	---	---
552 Kimmerling	D	Occasional	Brief	Dec-Mar	0.5-1.5	Apparent	Dec-May
553 Kimmerling	D	Occasional	Brief	Dec-Mar	1.0-2.0	Apparent	Dec-May
555 Kimmerling	D	Occasional	Brief	Dec-Mar	1.0-2.0	Apparent	Mar-Jun
561*, 562*:							
Koontz	D	None	---	---	>6.0	---	---
Sutro	C	None	---	---	>6.0	---	---
571*:							
Kram	D	None	---	---	>6.0	---	---
Puett Variant	C	None	---	---	>6.0	---	---
581*:							
Loomer	D	None	---	---	>6.0	---	---
582*:							
Loomer	D	None	---	---	>6.0	---	---
Olac	D	None	---	---	>6.0	---	---
583*:							
Loomer	D	None	---	---	>6.0	---	---
Zephan	C	None	---	---	>6.0	---	---
Olac	D	None	---	---	>6.0	---	---
591*:							
Minneha	D	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
592*:							
Minneha	D	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
Rock outcrop.							
601, 602 Mottsville	A	None	---	---	>6.0	---	---
603 Mottsville	A	Rare	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
604*:							
Mottsville	A	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
611, 612 Nevador	B	None	---	---	>6.0	---	---
621, 622 Niwot	C	Occasional	Brief	Dec-Mar	1.5-3.0	Apparent	Dec-May
631*:							
Olac	D	None	---	---	>6.0	---	---
Ister	C	None	---	---	>6.0	---	---
Rock outcrop.							
641, 642 Ophir	C	None	---	---	1.5-3.5	Apparent	Dec-May
644 Ophir Variant	D	Rare	---	---	0-1.5	Apparent	Dec-Aug
651*:							
Oppio	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
661, 662 Ormsby	C	Rare	---	---	3.0-5.0	Apparent	Dec-May
671*:							
Pernty	D	None	---	---	>6.0	---	---
Burnborough Variant	B	None	---	---	>6.0	---	---
Chen	D	None	---	---	>6.0	---	---
672*:							
Pernty	D	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
673*:							
Pernty	D	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
Rock outcrop.							
681, 682, 683 Phing	C	None	---	---	>6.0	---	---
685*:							
Phing	C	None	---	---	>6.0	---	---
Chalco	D	None	---	---	>6.0	---	---
Uhaldi	B	None	---	---	>6.0	---	---
691 Updike Variant	C	Rare	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
693*:							
Updike Variant	C	Rare	---	---	>6.0	---	---
Playas.							
702 Perazzo	B	None	---	---	>6.0	---	---
712, 713 Prey	C	None	---	---	>6.0	---	---
721 Prey Variant	D	None	---	---	>6.0	---	---
731 Job Variant	C	Occasional	Brief	Dec-Mar	3.0-4.0	Apparent	Sep-Jun
741*:							
Puett	D	None	---	---	>6.0	---	---
Chalco	D	None	---	---	>6.0	---	---
742*:							
Puett	D	None	---	---	>6.0	---	---
Chalco	D	None	---	---	>6.0	---	---
Pula	C	None	---	---	>6.0	---	---
743*:							
Puett	D	None	---	---	>6.0	---	---
Verdico	D	None	---	---	>6.0	---	---
Haybourne	B	Rare	---	---	>6.0	---	---
744*:							
Puett	D	None	---	---	>6.0	---	---
Verdico	D	None	---	---	>6.0	---	---
Uhaldi	B	None	---	---	>6.0	---	---
751*:							
Pula	C	None	---	---	>6.0	---	---
Cassiro	C	None	---	---	>6.0	---	---
752*:							
Pula	C	None	---	---	>6.0	---	---
Chalco	D	None	---	---	>6.0	---	---
Pung	C	None	---	---	>6.0	---	---
753*:							
Pula	C	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
Pung	C	None	---	---	>6.0	---	---
762*:							
Pulcan	C	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
762*:							
Puett	D	None	---	---	>6.0	---	---
Uhaldi	B	None	---	---	>6.0	---	---
771, 772 Rawe	C	None	---	---	>6.0	---	---
781, 782, 783, 784 Reno	D	None	---	---	>6.0	---	---
785*:							
Phing Variant	D	None	---	---	>6.0	---	---
Reno	D	None	---	---	>6.0	---	---
786*:							
Reno	D	None	---	---	>6.0	---	---
Phing	C	None	---	---	>6.0	---	---
Springmeyer	C	None	---	---	>6.0	---	---
787*:							
Reno	D	None	---	---	>6.0	---	---
Saralegui	B	Rare	---	---	>6.0	---	---
788*:							
Reno	D	None	---	---	>6.0	---	---
Stucky	B	None	---	---	>6.0	---	---
789*:							
Phing Variant	D	None	---	---	>6.0	---	---
Zephan	C	None	---	---	>6.0	---	---
791, 792 Risue	D	None	---	---	>6.0	---	---
801*. Riverwash							
811*. Rock outcrop							
821*:							
Roloc	D	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
831, 832 Saralegui	B	Rare	---	---	>6.0	---	---
833*:							
Saralegui	B	Rare	---	---	>6.0	---	---
834*:							
Saralegui	B	Rare	---	---	>6.0	---	---
Haybourne	B	Rare	---	---	>6.0	---	---
Reno	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
841*:							
Searles	C	None	---	---	>6.0	---	---
Devada	D	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
842*:							
Searles	C	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
843*:							
Searles	C	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
Chen	D	None	---	---	>6.0	---	---
851 Settlemeyer	D	Occasional	Brief	Dec-Mar	1.0-3.0	Apparent	Dec-May
852 Settlemeyer	D	Occasional	Brief	Dec-Mar	3.0-4.0	Apparent	Dec-May
854 Settlemeyer	D	Occasional	Brief	Dec-Mar	3.0-4.0	Apparent	Dec-May
861 Shakespeare	C	None	---	---	3.0-5.0	Apparent	Dec-May
871, 872 Shree	B	Rare	---	---	>6.0	---	---
873*:							
Shree	B	Rare	---	---	>6.0	---	---
Settlemeyer	D	Occasional	Brief	Dec-Mar	3.0-4.0	Apparent	Dec-May
874*:							
Shree	B	Rare	---	---	>6.0	---	---
Pung	C	None	---	---	>6.0	---	---
881, 882, 883, 884 Springmeyer	C	None	---	---	>6.0	---	---
891 Stodick	D	None	---	---	>6.0	---	---
892*:							
Stodick	D	None	---	---	>6.0	---	---
Indiano	C	None	---	---	>6.0	---	---
901*:							
Surgem	C	None	---	---	>6.0	---	---
Olac	D	None	---	---	>6.0	---	---
Cagle	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
911*, 912*:							
Theon	D	None	---	---	>6.0	---	---
921, 922, 923 Nevador Variant	C	None	---	---	>6.0	---	---
931*, 932*:							
Temo	C	None	---	---	>6.0	---	---
Rock outcrop.							
941*, 942*:							
Toiyabe	C	None	---	---	>6.0	---	---
Rock outcrop.							
951, 952, 953 Toll	A	None	---	---	>6.0	---	---
961*:							
Burnborough	B	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
962*:							
Burnborough	B	None	---	---	>6.0	---	---
Pernty	D	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---
963*:							
Burnborough	B	None	---	---	>6.0	---	---
Sup	B	None	---	---	>6.0	---	---
Chen	D	None	---	---	>6.0	---	---
972*:							
Trid	C	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
973*:							
Trid	B	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
974*:							
Trid	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
Drit	B	None	---	---	>6.0	---	---
975*:							
Trid	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
Glean	B	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
976*:							
Trid	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
Mottsville	A	None	---	---	>6.0	---	---
977*:							
Trid	B	None	---	---	>6.0	---	---
Roloc	D	None	---	---	>6.0	---	---
Sup	B	None	---	---	>6.0	---	---
982 Turria	C	Rare	---	---	>6.0	---	---
985 Turria	B	Rare	---	---	4.0-6.0	Apparent	May-Aug
986 Turria	C	Rare	---	---	>6.0	---	---
992 Updike	D	Rare	---	---	5.0-6.0	Apparent	Mar-May
993*:							
Updike	D	Occasional	Long	Dec-May	5.0-6.0	Apparent	Mar-May
Springmeyer	B	Rare	---	---	>6.0	---	---
994 Updike	D	Rare	---	---	5.0-6.0	Apparent	Mar-May
1011*:							
Verdico	D	None	---	---	>6.0	---	---
Puett	D	None	---	---	>6.0	---	---
1012*:							
Verdico	D	None	---	---	>6.0	---	---
Uhaldi	B	None	---	---	>6.0	---	---
Springmeyer	C	None	---	---	>6.0	---	---
1021 Veta	B	Rare	---	---	>6.0	---	---
1031*:							
Vicee	B	None	---	---	>6.0	---	---
Rock outcrop.							
1041 Voltaire	D	Occasional	Brief	Dec-Mar	0-1.5	Apparent	Dec-May
1042, 1044 Voltaire	D	Occasional	Brief	Dec-Mar	1.5-3.0	Apparent	Dec-May
1051 Voltaire Variant	D	Rare	---	---	1.0-2.0	Apparent	Feb-Aug
1061, 1062, 1063 Washoe	B	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1066*:							
Washoe	B	None	---	---	>6.0	---	---
Reno	D	None	---	---	>6.0	---	---
1071 Corbett	B	None	---	---	>6.0	---	---
1072*, 1073*:							
Corbett	B	None	---	---	>6.0	---	---
Toiyabe	C	None	---	---	>6.0	---	---
1081*:							
Zephan	C	None	---	---	>6.0	---	---
1091*:							
Uhaldi	B	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
1101*:							
Pung	C	None	---	---	>6.0	---	---
Phing	C	None	---	---	>6.0	---	---
Chalco	D	None	---	---	>6.0	---	---
1102*:							
Pung	C	None	---	---	>6.0	---	---
Pula	C	None	---	---	>6.0	---	---
Uhaldi	B	None	---	---	>6.0	---	---
1111, 1112*:							
Stucky	B	None	---	---	>6.0	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL FEATURES

[The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
101: Aldax	10-20	Hard	---	---	Moderate	Low	Low.
102*:							
Aldax	10-20	Hard	---	---	Moderate	Low	Low.
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
111: Borda	40-60	Hard	---	---	Low	High	Low.
121*:							
Borda Variant	>60	---	---	---	Low	Moderate	Low.
Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
Burnborough Variant	25-40	Soft	---	---	Moderate	Moderate	Moderate.
122*:							
Borda Variant	>60	---	---	---	Low	Moderate	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
123*:							
Borda Variant	>60	---	---	---	Low	Moderate	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Moderate.
Chen	12-20	Hard	---	---	Low	Moderate	Low.
124*:							
Borda Variant	>60	---	---	---	Low	Moderate	Low.
Burnborough Variant	25-40	Soft	---	---	Moderate	Moderate	Moderate.
Cassiro	>60	---	---	---	Low	Moderate	Low.
141: Brockliss	>60	---	---	---	Low	Moderate	Low.
151*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Deven	12-20	Hard	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
152*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
153*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
154*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
155*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
Borda	40-60	Hard	---	---	Low	High	Low.
156*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
Rock outcrop.							
161*, 162*, 163*, 164*:							
Witefels	20-40	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
165*:							
Witefels	20-40	Soft	---	---	Low	Moderate	Moderate.
Temo	8-20	Soft	---	---	Low	Low	Moderate.
181*:							
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
Chalco	10-20	Soft	---	---	Low	High	Low.
182*:							
Chalco	10-20	Soft	---	---	Low	High	Low.
Pula	>60	---	---	---	Low	Moderate	Low.
183*:							
Chalco	10-20	Soft	---	---	Low	High	Low.
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
191, 192, 193, 194 Cradlebaugh	>60	---	---	---	High	High	High.
201 Dangberg	>60	---	24-33	Thin	Moderate	High	Low.
202, 203 Dangberg	>60	---	24-33	Thin	Moderate	High	Moderate.
204, 205 Dangberg	>60	---	24-33	Thin	Moderate	High	Low.
211*:							
Devada	12-20	Hard	---	---	Low	High	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
212*:							
Devada	12-20	Hard	---	---	Low	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
212*:							
Koontz	8-20	Soft	---	---	Moderate	Moderate	Low.
213*:							
Devada	12-20	Hard	---	---	Low	High	Low.
Burnborough Variant	25-40	Soft	---	---	Moderate	Moderate	Moderate.
214*:							
Devada	12-20	Hard	---	---	Low	High	Low.
Rock outcrop.							
221 East Fork Variant	>60	---	---	---	Moderate	Moderate	Low.
231*:							
Brockliss Variant	>60	---	---	---	Moderate	Moderate	Low.
Dangberg	>60	---	24-33	Thin	Moderate	High	Low.
241, 242 Dressler	>60	---	---	---	High	Moderate	Low.
251*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Cagle	20-40	Soft	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
252*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Devada	12-20	Hard	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
253*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
254*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
Burnborough Variant	25-40	Soft	---	---	Moderate	Moderate	Moderate.
255*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Searles	20-40	Hard	---	---	Moderate	Moderate	Low.
261*:							
Dumps.							
Pits.							
271, 272 East Fork	>60	---	---	---	High	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
281, 282: Fettic	>60	---	---	---	High	High	Low.
292*: Vicee Variant	24-40	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							
301*: Franktown	6-20	Hard	---	---	Moderate	Moderate	Moderate.
Rubble land.							
Rock outcrop.							
311, 312, 313, 314, 315: Gardnerville	>60	---	---	---	Low	High	Moderate.
321*: Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
322*: Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							
331*: Glean	40-70	Hard	---	---	Moderate	Moderate	Moderate.
Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
Glean	40-60	Hard	---	---	Moderate	Moderate	Moderate.
332*: Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
Rubble land.							
334*: Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
Sup	>60	---	---	---	Moderate	Moderate	Moderate.
Genoa	10-20	Hard	---	---	Moderate	Moderate	Moderate.
341*: Glenbrook	10-20	Soft	---	---	Low	Low	Low.
342*: Glenbrook	10-20	Soft	---	---	Low	Low	Low.
Rock outcrop.							
351: Godecke	>60	---	---	---	High	High	High.
362*, 363*: Gralic	>60	---	---	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
362*, 363*: Rock outcrop.							
371, 372 Graylock	40-60	Hard	---	---	Low	Moderate	Moderate.
381, 382 Greenbrae	>60	---	---	---	Moderate	Moderate	Moderate.
391, 392, 393, 394 Haybourne	>60	---	---	---	Moderate	Moderate	Low.
401, 402 Heidtman	>60	---	---	---	High	High	Low.
411 Henningsen	>60	---	---	---	Moderate	Moderate	Low.
412 Henningsen	>60	---	---	---	Moderate	Moderate	Low.
413 Henningsen	>60	---	---	---	Moderate	Moderate	Low.
414 Henningsen	>60	---	---	---	Moderate	Moderate	Low.
422 Henningsen Variant	>60	---	---	---	High	Moderate	Low.
431* Shalcar family	>60	---	---	---	Moderate	High	Low.
442, 443 Holbrook	>60	---	---	---	Moderate	High	Low.
444*:							
Holbrook	>60	---	---	---	Moderate	High	Low.
Glenbrook	10-20	Soft	---	---	Low	Low	Low.
445*:							
Holbrook	>60	---	---	---	Moderate	High	Low.
Greenbrae	>60	---	---	---	Moderate	Moderate	Moderate.
Reno	>60	---	20-40	Thick	Moderate	High	Low.
446*:							
Holbrook	>60	---	---	---	Moderate	High	Low.
Verdico	20-40	Soft	---	---	Low	High	Low.
451*:							
Hyloc	14-20	Soft	---	---	Low	Moderate	Low.
Ister	25-40	Hard	---	---	Moderate	Moderate	Low.
461 Hussman	>60	---	---	---	High	High	Low.
462 Hussman	>60	---	---	---	High	High	High.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
463 Hussman	>60	---	---	---	High	High	Low.
471 Incy	>60	---	---	---	Low	Moderate	Low.
481, 482, 483 Indian Creek	>60	---	14-20	Thick	Low	High	Low.
485*:							
Indian Creek	>60	---	14-20	Thick	Low	High	Low.
Haybourne	>60	---	---	---	Moderate	Moderate	Low.
486*:							
Indian Creek	>60	---	14-20	Thick	Low	High	Low.
Reno	>60	---	20-40	Thick	Moderate	Moderate	Moderate.
Cassiro	>60	---	---	---	Low	Moderate	Low.
487*:							
Indian Creek Variant	>60	---	12-18	Thick	Moderate	High	Low.
Cassiro	>60	---	---	---	Low	Moderate	Low.
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
488*:							
Indian Creek Variant	>60	---	12-18	Thick	Moderate	High	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
491 Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
501, 502 James Canyon	>60	---	---	---	High	Moderate	Low.
503 Kimmerling Variant	>60	---	---	---	High	Moderate	Low.
511, 512 James Canyon Variant	>60	---	---	---	High	High	High.
521, 523, 524 Job	>60	---	---	---	High	High	Moderate.
531 Jubilee	>60	---	---	---	High	Moderate	Low.
532 Jubilee	>60	---	---	---	High	High	Low.
533 Jubilee Variant	>60	---	---	---	High	Moderate	Low.
534*:							
Jubilee	>60	---	---	---	High	High	Low.
Dressler	>60	---	---	---	High	Moderate	Low.
Kimmerling	>60	---	---	---	High	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
541*:							
Softscrabble	>60	---	---	---	Moderate	Moderate	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
Genoa	12-20	Hard	---	---	Moderate	Moderate	Moderate.
552 Kimmerling	>60	---	---	---	High	Moderate	Low.
553, 555 Kimmerling	>60	---	---	---	High	High	Low.
561*, 562*:							
Koontz	10-20	Soft	---	---	Moderate	Moderate	Low.
Sutro	20-40	Soft	---	---	Moderate	Moderate	Low.
571*:							
Kram	8-14	Hard	---	---	Moderate	High	Moderate.
Puett Variant	24-40	Soft	---	---	Moderate	Moderate	Low.
581*:							
Loomer	14-20	Hard	---	---	Low	Moderate	Low.
582*:							
Loomer	14-20	Hard	---	---	Low	Moderate	Low.
Olac	8-14	Hard	---	---	Moderate	Moderate	Low.
583*:							
Loomer	14-20	Hard	---	---	Low	Moderate	Low.
Zephan	25-40	Soft	---	---	Moderate	High	Moderate.
Olac	8-14	Hard	---	---	Moderate	Moderate	Low.
591*:							
Minneha	13-20	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Moderate.
592*:							
Minneha	13-20	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
Rock outcrop.							
601, 602 Mottsville	>60	---	---	---	Low	Moderate	Moderate.
603 Mottsville	>60	---	---	---	Low	Moderate	Moderate.
604*:							
Mottsville	>60	---	---	---	Low	Moderate	Moderate.
Drit	>60	---	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
611, 612 Nevador	>60	---	---	---	Moderate	High	Moderate.
621, 622 Niwot	>60	---	---	---	High	High	Low.
631*:							
Olac	8-14	Hard	---	---	Moderate	Moderate	Low.
Ister	25-40	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							
641, 642 Ophir	>60	---	---	---	Moderate	Moderate	Low.
644 Ophir Variant	>60	---	---	---	High	Moderate	Moderate.
651*:							
Oppio	20-40	Hard	---	---	Moderate	High	Moderate.
Nosrac	>60	---	---	---	Moderate	High	Low.
661, 662 Ormsby	>60	---	---	---	Moderate	High	Low.
671*:							
Pernty	14-20	Hard	---	---	Moderate	Moderate	Low.
Burnborough Variant	25-40	Soft	---	---	Moderate	Moderate	Moderate.
Chen	12-20	Hard	---	---	Low	Moderate	Low.
672*:							
Pernty	14-20	Hard	---	---	Moderate	Moderate	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
673*:							
Pernty	14-20	Hard	---	---	Moderate	Moderate	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
Rock outcrop.							
681, 682, 683 Phing	>60	---	---	---	Low	High	Low.
685*:							
Phing	>60	---	---	---	Low	High	Low.
Chalco	10-20	Soft	---	---	Low	High	Low.
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
691 Updike Variant	>60	---	---	---	Moderate	High	High.
693*:							
Updike Variant	>60	---	---	---	Moderate	High	High.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock Depth	Bedrock Hardness	Cemented pan Depth	Cemented pan Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In		In				
693*: Playas.							
702 Perazzo	>60	---	---	---	Low	High	Low.
712, 713 Prey	>60	---	26-38	Thin	Moderate	Moderate	Low.
721 Prey Variant	>60	---	14-20	Thin	Moderate	Moderate	Low.
731 Job Variant	>60	---	---	---	High	High	High.
741*:							
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
Chalco	10-20	Soft	---	---	Low	High	Low.
742*:							
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
Pula	>60	---	---	---	Low	Moderate	Low.
743*:							
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
Verdico	20-40	Soft	---	---	Low	High	Low.
Haybourne	>60	---	---	---	Moderate	Moderate	Low.
744*:							
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
Verdico	20-40	Soft	---	---	Low	High	Low.
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
751*:							
Pula	>60	---	---	---	Low	Moderate	Low.
Cassiro	>60	---	---	---	Low	Moderate	Low.
752*:							
Pula	>60	---	---	---	Low	Moderate	Low.
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
Pung	>60	---	---	---	Low	High	Low.
753*:							
Pula	>60	---	---	---	Low	Moderate	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
Pung	>60	---	---	---	Low	High	Low.
762*:							
Pulcan	28-40	Soft	---	---	Low	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
762*:							
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
771, 772 Rawe	>60	---	---	---	Low	High	Low.
781, 782 Reno	>60	---	20-40	Thick	Moderate	High	Low.
783 Reno	>60	---	20-40	Thick	Moderate	Moderate	Moderate.
784 Reno	>60	---	20-40	Thick	Moderate	High	Low.
785*:							
Phing Variant	>60	---	20-40	Thick	Moderate	High	Low.
Reno	>60	---	20-40	Thick	Moderate	High	Low.
786*:							
Reno	>60	---	20-40	Thick	Moderate	Moderate	Moderate.
Phing	>60	---	---	---	Low	High	Low.
Springmeyer	>60	---	---	---	Moderate	Moderate	Low.
787*:							
Reno	>60	---	20-40	Thick	Moderate	High	Low.
Saralegui	>60	---	---	---	Moderate	High	Low.
788*:							
Reno	>60	---	20-40	Thick	Moderate	High	Low.
Stucky	>60	---	---	---	Moderate	High	Low.
789*:							
Phing Variant	>60	---	20-40	Thick	Moderate	High	Low.
Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
791, 792 Risue	>60	---	10-20	Thick	Low	High	Low.
801*. Riverwash							
811*. Rock outcrop							
821*:							
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
831, 832, 833*:							
Saralegui	>60	---	---	---	Moderate	High	Low.
834*:							
Saralegui	>60	---	---	---	Moderate	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
834*:							
Haybourne	>60	---	---	---	Moderate	Moderate	Low.
Reno	>60	---	20-40	Thick	Moderate	Moderate	Moderate.
841*:							
Searles	20-40	Hard	---	---	Moderate	Moderate	Low.
Devada	12-20	Hard	---	---	Low	High	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
842*:							
Searles	20-40	Hard	---	---	Moderate	Moderate	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
843*:							
Searles	20-40	Hard	---	---	Moderate	Moderate	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
Chen	12-20	Hard	---	---	Low	Moderate	Low.
851 Settlemeyer	>60	---	---	---	High	High	Moderate.
852, 854 Settlemeyer	>60	---	---	---	High	High	Low.
861 Shakespeare	>60	---	---	---	High	Moderate	Moderate.
871, 872 Shree	>60	---	---	---	Moderate	Moderate	Low.
873*:							
Shree	>60	---	---	---	Moderate	Moderate	Low.
Settlemeyer	>60	---	---	---	High	High	Low.
874*:							
Shree	>60	---	---	---	Moderate	Moderate	Low.
Pung	>60	---	---	---	Low	High	Low.
881, 882, 883, 884 Springmeyer	>60	---	---	---	Moderate	Moderate	Low.
891 Stodick	14-20	Soft	---	---	Moderate	Moderate	Low.
892*:							
Stodick	14-20	Soft	---	---	Moderate	Moderate	Low.
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
901*:							
Surgem	20-30	Hard	---	---	Low	High	Low.
Olac	8-14	Hard	---	---	Moderate	Moderate	Low.
Cagle	20-40	Soft	---	---	Low	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
911, 912 Theon	8-14	Hard	---	---	Low	High	Low.
921, 922, 923 Nevador Variant	>60	---	21-34	Thick	Moderate	Moderate	Low.
931*, 932*:							
Temo	8-20	Soft	---	---	Low	Low	Moderate.
Rock outcrop.							
941*, 942*:							
Toiyabe	10-20	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
951, 952 Toll	>60	---	---	---	Low	Low	Low.
953 Toll	>60	---	---	---	Low	Moderate	Low.
961*:							
Burnborough	>60	---	---	---	Moderate	Low	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
962*:							
Burnborough	>60	---	---	---	Moderate	Low	Low.
Pernty	14-20	Hard	---	---	Moderate	Moderate	Low.
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
963*:							
Burnborough	>60	---	---	---	Moderate	Low	Low.
Sup	>60	---	---	---	Moderate	Moderate	Moderate.
Chen	12-20	Hard	---	---	Low	Moderate	Low.
972*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
973*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
974*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
Drit	>60	---	---	---	Moderate	Moderate	Low.
975*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
975*:							
Glean	40-70	Hard	---	---	Moderate	Moderate	Low.
976*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
Mottsville	>60	---	---	---	Low	Moderate	Moderate.
977*:							
Trid	20-40	Soft	---	---	Moderate	Moderate	Low.
Roloc	14-20	Soft	---	---	Moderate	Moderate	Low.
Sup	>60	---	---	---	Moderate	Moderate	Moderate.
982, 985, 986 Turria	>60	---	---	---	Moderate	Moderate	Low.
992 Updike	>60	---	---	---	Low	High	Low.
993*:							
Updike	>60	---	---	---	Low	High	Low.
Springmeyer	>60	---	---	---	Moderate	High	Low.
994 Updike	>60	---	---	---	Low	High	Low.
1011*:							
Verdico	20-40	Soft	---	---	Low	High	Low.
Puett	10-20	Soft	---	---	Moderate	Moderate	Low.
1012*:							
Verdico	20-40	Soft	---	---	Low	High	Low.
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
Springmeyer	>60	---	---	---	Moderate	Moderate	Low.
1021 Veta	>60	---	---	---	Moderate	High	Low.
1031*:							
Vicee	>60	---	---	---	Moderate	Moderate	Low.
Rock outcrop.							
1041 Voltaire	>60	---	---	---	High	High	High.
1042, 1044 Voltaire	>60	---	---	---	High	High	Low.
1051 Voltaire Variant	>60	---	---	---	High	High	High.
1061, 1062, 1063 Washoe	>60	---	---	---	Moderate	Moderate	Low.
1066*:							
Washoe	>60	---	---	---	Moderate	Moderate	Low.
Reno	>60	---	20-40	Thick	Moderate	High	Low.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock: Depth	Bedrock: Hardness	Cemented pan: Depth	Cemented pan: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In		In				
1071 Corbett	24-40	Soft	---	---	Low	Moderate	Moderate.
1072*, 1073*:							
Corbett	24-40	Soft	---	---	Low	Moderate	Moderate.
Toiyabe	10-20	Soft	---	---	Low	Moderate	Moderate.
1081*:							
Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
Zephan	25-40	Soft	---	---	Moderate	High	Moderate.
1091*:							
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
Nosrac	>60	---	---	---	Moderate	High	Low.
1101*:							
Pung	>60	---	---	---	Low	High	Low.
Phing	>60	---	---	---	Low	High	Low.
Chalco	10-20	Soft	---	---	Low	Moderate	Low.
1102*:							
Pung	>60	---	---	---	Low	High	Low.
Pula	>60	---	---	---	Low	Moderate	Low.
Uhaldi	20-40	Soft	---	---	Moderate	Moderate	Moderate.
1111, 1112*:							
Stucky	>60	---	---	---	Moderate	High	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Aldax	Loamy-skeletal, mixed, mesic Lithic Haploxerolls
Borda	Fine, montmorillonitic, mesic Xerollic Paleargids
Borda Variant	Clayey-skeletal, montmorillonitic, frigid Xerollic Haplargids
Brockliss	Sandy-skeletal, mixed, mesic Torriorthentic Haploxerolls
Brockliss Variant	Loamy-skeletal, mixed, mesic Cumulic Haploxerolls
Burnborough	Loamy-skeletal, mixed, frigid Aridic Argixerolls
Burnborough Variant	Fine-loamy, mixed, frigid Pachic Argixerolls
Cagle	Fine, montmorillonitic, mesic Aridic Argixerolls
Cassiro	Clayey-skeletal, montmorillonitic, mesic Aridic Argixerolls
Chalco	Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids
Chen	Clayey-skeletal, montmorillonitic, frigid Lithic Argixerolls
Corbett	Mixed, frigid Typic Xeropsamments
Cradlebaugh	Fine-loamy, mixed (calcareous), mesic Duric Haplaquolls
Dangberg	Fine, montmorillonitic, mesic Aquic Haplic Nadurargids
Devada	Clayey, montmorillonitic, mesic Lithic Argixerolls
Deven	Clayey, montmorillonitic, mesic Lithic Argixerolls
Dressler	Coarse-loamy, mixed, mesic Aquic Haploxerolls
Drit	Loamy-skeletal, mixed, mesic Pachic Haploxerolls
Duco	Loamy-skeletal, mixed, mesic Lithic Argixerolls
East Fork	Fine-loamy, mixed, mesic Fluvaquentic Haploxerolls
East Fork Variant	Fine-loamy, mixed, mesic Cumulic Haploxerolls
Fettic	Fine-silty, mixed, mesic Aquic Natrixerolls
Franktown	Loamy-skeletal, mixed, frigid Lithic Ultic Haploxerolls
Gardnerville	Fine, montmorillonitic, mesic Durixerollic Natrargids
Genoa	Loamy-skeletal, mixed Argic Lithic Cryoborolls
Glean	Loamy-skeletal, mixed, frigid Pachic Haploxerolls
Glenbrook	Mixed, mesic, shallow Xeric Torripsamments
Godecke	Fine-loamy, mixed, mesic Aquic Natrargids
Gralic	Loamy-skeletal, mixed, nonacid Typic Cryorthents
Graylock	Sandy-skeletal, mixed Typic Cryorthents
Greenbrae	Fine-loamy, mixed, mesic Xerollic Haplargids
Haybourne	Coarse-loamy, mixed, mesic Xerollic Camborthids
Heidtman	Fine-loamy, mixed, mesic Fluvaquentic Haploxerolls
Henningsen	Sandy-skeletal, mixed, mesic Aquic Haploxerolls
Henningsen Variant	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Haploxerolls
Holbrook	Loamy-skeletal, mixed, mesic Aridic Haploxerolls
Hussman	Fine, montmorillonitic, mesic Fluvaquentic Haploxerolls
Hyloc	Clayey, montmorillonitic, mesic, shallow Aridic Argixerolls
Incy	Mixed, mesic Xeric Torripsamments
Indian Creek	Clayey, montmorillonitic, mesic, shallow Xerollic Durargids
Indian Creek Variant	Loamy-skeletal, mixed, mesic, shallow Xerollic Durargids
Indiano	Fine-loamy, mixed, mesic Aridic Argixerolls
Ister	Loamy-skeletal, mixed, mesic Aridic Argixerolls
James Canyon	Fine-loamy, mixed, mesic Cumulic Haplaquolls
James Canyon Variant	Fine-loamy, mixed, mesic Aeric Calciaquoll
Job	Coarse-loamy, mixed (calcareous), mesic Aquic Xerofluvents
Job Variant	Coarse-silty, gypsic, mesic Aquic Torriorthents
Jubilee	Coarse-loamy, mixed, mesic Typic Haplaquolls
Jubilee Variant	Coarse-loamy, mixed, mesic Histic Haplaquolls
Kimmerling	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Kimmerling Variant	Fine-loamy, mixed, mesic Histic Haplaquolls
Koontz	Loamy-skeletal, mixed, mesic, shallow Aridic Argixerolls
Kram	Loamy-skeletal, carbonatic, mesic Lithic Xeric Torriorthents
Loomer	Clayey-skeletal, montmorillonitic, mesic Lithic Argixerolls
Minneha	Loamy-skeletal, mixed, mesic, shallow Aridic Haploxerolls
Mottsville	Sandy, mixed, mesic Torripsammentic Haploxerolls
Nevador	Fine-loamy, mixed, mesic Durixerollic Haplargids
Nevador Variant	Fine-loamy, mixed, mesic Aridic Durixerolls
Niwot	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls
Nosrac	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Olac	Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids
Ophir	Sandy, mixed, mesic Typic Haplaquolls
Ophir Variant	Sandy,mixed,mesic Histic Haploquolls
Oppio	Fine, montmorillonitic, mesic Xerollic Haplargids
Ormsby	Mixed, mesic Aquic Durorthidic Xeropsamments
Perazzo	Loamy, skeletal, mixed, mesic Typic Haplargids
Pernty	Loamy-skeletal, mixed, frigid Lithic Argixerolls
Phing	Fine, montmorillonitic, mesic Xerollic Paleargids
Phing Variant	Fine, montmorillionitic, mesic Xerollic Nadurargids

TABLE 18.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Prey	Coarse-loamy, mixed, mesic Haploxerollic Durargids
Prey Variant	Loamy, mixed, mesic, shallow Aridic Durixerolls
Puett	Loamy, mixed (calcareous), mesic, shallow Xeric Torriorthents
Puett Variant	Loamy-skeletal, mixed, mesic Aridic Haploxerolls
Pula	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids
Pulcan	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids
Pung	Fine, montmorillonitic, mesic Durargidic Argixerolls
Rawe	Clayey over loamy-skeletal, montmorillonitic, mesic Typic Haplargids
Reno	Fine, montmorillonitic, mesic Abruptic Xerollic Durargids
Risue	Clayey, montmorillonitic, mesic, shallow Abruptic Durargids
Roloc	Loamy-skeletal, mixed, mesic, shallow Aridic Argixerolls
Saralegui	Coarse-loamy, mixed, mesic Xerollic Haplargids
Searles	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Settlemeyer	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Shakespeare	Loamy-skeletal, mixed Aquic Cryoboralfs
Shalcar family	Loamy, mixed, euic, mesic Terric Medisaprists
Shree	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Softscrabble	Loamy-skeletal, mixed, frigid Pachic Argixerolls
Springmeyer	Fine-loamy, mixed, mesic Aridic Argixerolls
Stodick	Loamy-skeletal, mixed, mesic, shallow Xerollic Haplargids
Stucky	Loamy-skeletal, mixed, mesic Xerollic Haplargids
Sup	Loamy-skeletal, mixed Typic Cryoborolls
Surgem	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids
Sutro	Fine-loamy, mixed, mesic Aridic Haploxerolls
Temo	Mixed, shallow Typic Cryopsamments
Theon	Loamy-skeletal, mixed, mesic Lithic Haplargids
Toiyabe	Mixed, frigid, shallow Typic Xeropsamments
Toll	Mixed, mesic Xeric Torripsamments
Trid	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Turria	Fine-loamy, mixed, mesic Xerollic Haplargids
Uhaldi	Fine-loamy, mixed, mesic Aridic Argixerolls
Updike	Fine, montmorillonitic, mesic Typic Natrargids
Updike Variant	Fine-loamy, mixed, mesic Typic Natrargids
Verdico	Fine, montmorillonitic, mesic Xerollic Paleargids
Veta	Loamy-skeletal, mixed, mesic Xerollic Camborthids
Vicee	Coarse-loamy, mixed, frigid Entic Ultic Haploxerolls
Vicee Variant	Loamy-skeletal, mixed Typic Cryoborolls
Voltaire	Fine-loamy, mixed (calcareous), mesic Fluvaquentic Haplaquolls
Voltaire Variant	Fine-loamy, mixed (calcareous), mesic Typic Halaquepts
Washoe	Loamy-skeletal, mixed, mesic Xerollic Haplargids
Witefels	Mixed Typic Cryopsamments
Zephan	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids

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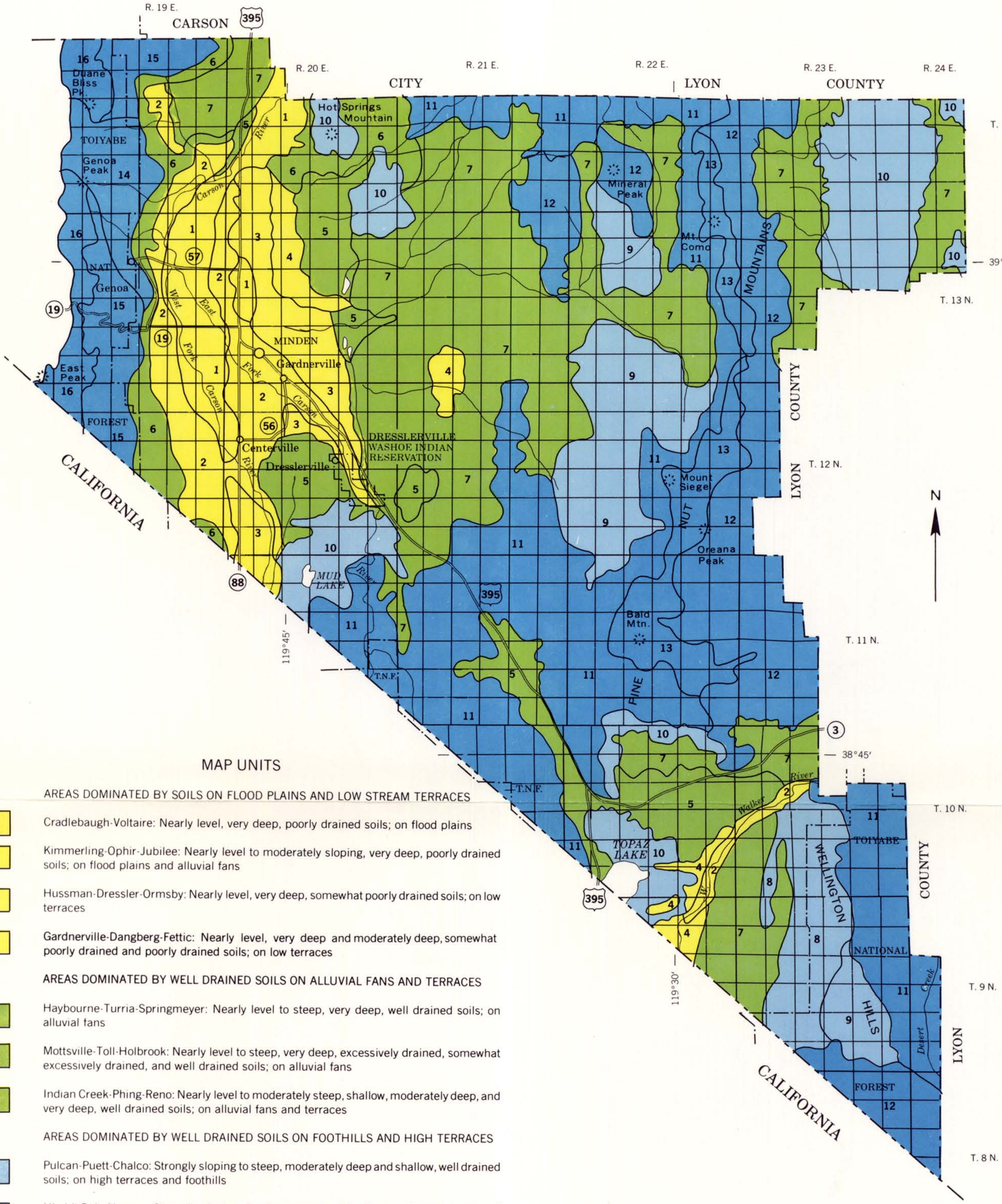

MAP UNITS

AREAS DOMINATED BY SOILS ON FLOOD PLAINS AND LOW STREAM TERRACES

1	Cradlebaugh-Voltaire: Nearly level, very deep, poorly drained soils; on flood plains
2	Kimmerling-Ophir-Jubilee: Nearly level to moderately sloping, very deep, poorly drained soils; on flood plains and alluvial fans
3	Hussman-Dressler-Ormsby: Nearly level, very deep, somewhat poorly drained soils; on low terraces
4	Gardnerville-Dangberg-Fettic: Nearly level, very deep and moderately deep, somewhat poorly drained and poorly drained soils; on low terraces

AREAS DOMINATED BY WELL DRAINED SOILS ON ALLUVIAL FANS AND TERRACES

5	Haybourne-Turria-Springmeyer: Nearly level to steep, very deep, well drained soils; on alluvial fans
6	Mottsville-Toll-Holbrook: Nearly level to steep, very deep, excessively drained, somewhat excessively drained, and well drained soils; on alluvial fans
7	Indian Creek-Phing-Reno: Nearly level to moderately steep, shallow, moderately deep, and very deep, well drained soils; on alluvial fans and terraces

AREAS DOMINATED BY WELL DRAINED SOILS ON FOOTHILLS AND HIGH TERRACES

8	Pulcan-Puett-Chalco: Strongly sloping to steep, moderately deep and shallow, well drained soils; on high terraces and foothills
9	Uhaldi-Pula-Nosrac: Strongly sloping to steep, moderately deep and very deep, well drained soils; on foothills and high terraces
10	Stodick-Indiano-Loomer: Moderately sloping to steep, shallow and moderately deep, well drained soils; on foothills

AREAS DOMINATED BY WELL DRAINED SOILS ON MOUNTAINS AND UPLANDS

11	Cagle-Duco-Nosrac: Strongly sloping to steep, shallow, moderately deep, and very deep, well drained soils; on uplands
12	Trid-Drit-Roloc: Moderately sloping to very steep, shallow, moderately deep, and very deep, well drained soils; on uplands
13	Glean-Genoa-Sup: Moderately sloping to very steep, shallow, deep, and very deep, well drained soils; on mountains
14	Vicee-Franktown-Rock outcrop: Steep to very steep, very shallow, shallow, and very deep, well drained and somewhat excessively drained soils, and rock outcrop; on mountains
15	Corbett-Toiyabe: Moderately sloping to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils; on lower mountainsides
16	Witefels-Temo: Moderately sloping to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils; on upper mountainsides

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U.S. DEPARTMENT OF AGRICULTURE
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BUREAU OF LAND MANAGEMENT
BUREAU OF INDIAN AFFAIRS
UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION

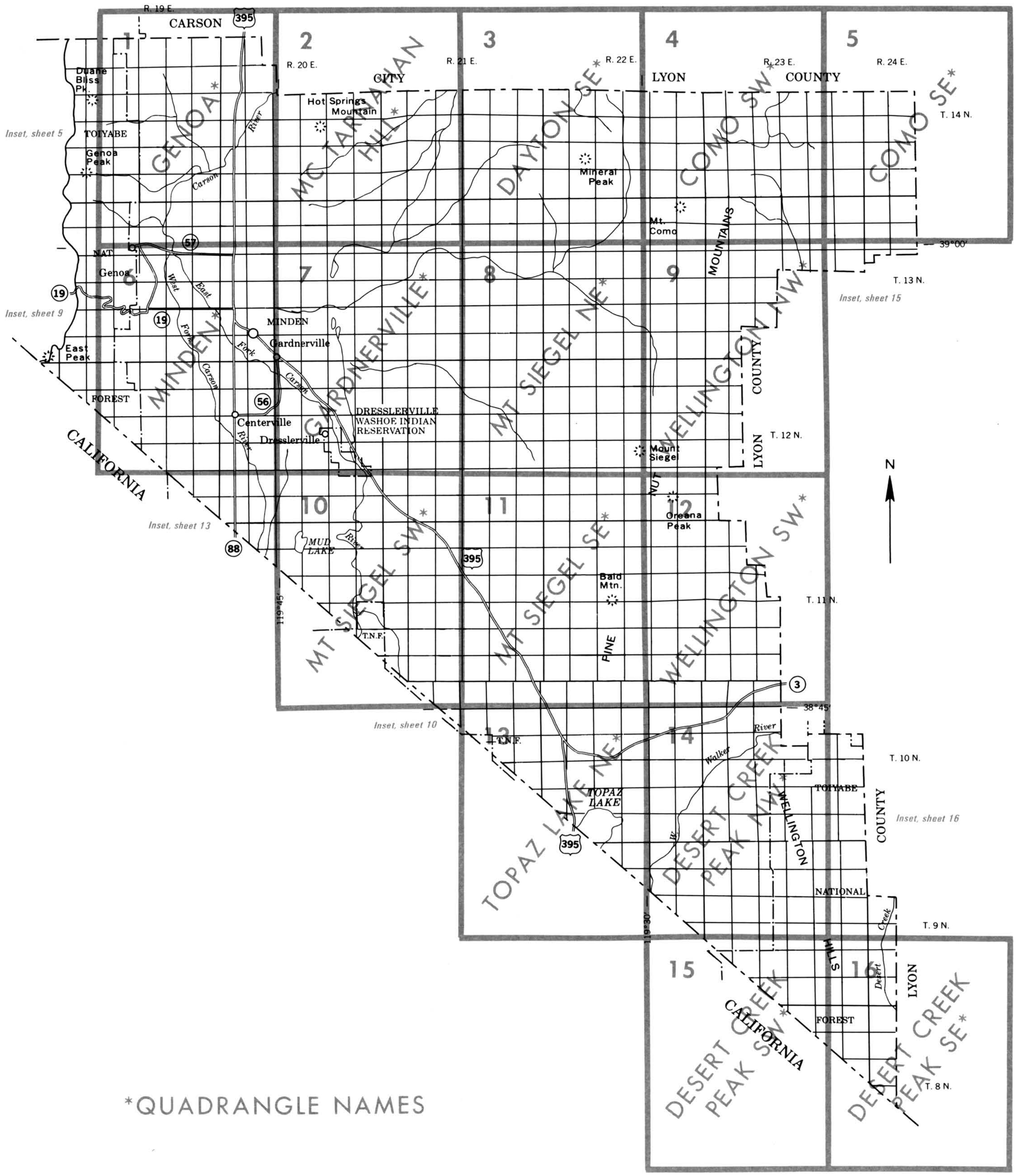
GENERAL SOIL MAP

DOUGLAS COUNTY AREA, NEVADA

SCALE 1:253,440

2 0 2 4 MILES

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



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DOUGLAS COUNTY AREA, NEVADA

SCALE 1:253,440

2 0 2 4 MILES

SOIL LEGEND

SYMBOL	NAME
101	Aldax stony fine sandy loam, 15 to 30 percent slopes
102	Aldax-Indiano association*
111	Borda gravelly sandy loam, 4 to 15 percent slopes
121	Borda Variant-Genoa-Burnborough Variant association*
122	Borda Variant-Glean association*
123	Borda Variant-Glean-Chen association*
124	Borda Variant-Burnborough Variant-Cassiro association*
141	Brockliss stony loamy sand, 0 to 8 percent slopes
151	Cagle-Deven-Nosrac association*
152	Cagle-Duco association*
153	Cagle-Duco-Rock outcrop association*
154	Cagle-Nosrac association*
155	Cagle-Nosrac-Borda association*
156	Cagle-Burnborough-Rock outcrop association*
161	Witefels-Rock outcrop complex, 4 to 15 percent slopes
162	Witefels-Rock outcrop complex, 15 to 30 percent slopes
163	Witefels-Rock outcrop complex, 30 to 50 percent slopes
164	Witefels-Rock outcrop complex, 50 to 75 percent slopes
165	Witefels-Temo complex, 30 to 75 percent slopes
181	Chalco complex, 8 to 30 percent slopes
182	Chalco-Pula association*
183	Chalco association*
191	Cradlebaugh clay loam, drained, slightly saline-alkali
192	Cradlebaugh clay loam, drained, strongly saline-alkali
193	Cradlebaugh clay loam, slightly saline-alkali
194	Cradlebaugh clay loam, strongly saline-alkali
201	Dangberg silt loam, drained, strongly saline-alkali
202	Dangberg clay, slightly saline-alkali
203	Dangberg clay, strongly saline-alkali
204	Dangberg clay, wet
205	Dangberg clay, wet, strongly alkali
211	Devada-Drit-Roloc association*
212	Devada-Koontz association*
213	Devada-Burnborough Variant association*
214	Devada-Rock outcrop association*
221	East Fork Variant loam
231	Brockliss Variant-Dangberg association*
241	Dressler coarse sandy loam
242	Dressler sandy loam, wet
251	Duco-Cagle-Nosrac association*
252	Duco-Devada-Nosrac association*
253	Duco-Nosrac association*
254	Duco-Nosrac-Burnborough Variant association*
255	Duco-Searles association*
261	Dumps-Pits complex, 15 to 75 percent slopes
271	East Fork loam
272	East Fork clay loam
281	Fettic very fine sandy loam
282	Fettic clay, strongly saline
292	Vicee Variant-Rock outcrop complex, 30 to 50 percent slopes
301	Franktown-Rubble land-Rock outcrop complex, 50 to 75 percent slopes
311	Gardnerville clay loam
312	Gardnerville clay loam, drained
313	Gardnerville clay loam, slightly saline-alkali
314	Gardnerville clay
315	Gardnerville clay, slightly saline-alkali
321	Genoa-Glean association*
322	Genoa-Glean-Rock outcrop association*
331	Glean-Genoa association*
332	Glean-Genoa-Rubble land association*
334	Glean-Sup-Genoa association*
341	Glenbrook sands, 8 to 30 percent slopes
342	Glenbrook-Rock outcrop complex, 30 to 50 percent slopes
351	Godecke fine sandy loam
362	Gralic-Rock outcrop complex, 8 to 50 percent slopes
363	Gralic-Rock outcrop complex, 50 to 75 percent slopes
371	Graylock extremely stony loamy coarse sand, 30 to 50 percent slopes
372	Graylock extremely stony loamy coarse sand, 50 to 75 percent slopes
381	Greenbrae fine sandy loam, 0 to 4 percent slopes
382	Greenbrae gravelly fine sandy loam, 4 to 8 percent slopes

SYMBOL	NAME
391	Haybourne sand, 0 to 4 percent slopes
392	Haybourne loam, 0 to 2 percent slopes
393	Haybourne loam, 2 to 4 percent slopes
394	Haybourne fine sandy loam, gravelly substratum, 0 to 2 percent slopes
401	Heidtman clay loam
402	Heidtman clay loam, clay substratum
411	Henningsen loam
412	Henningsen loam, wet
413	Henningsen gravelly loam
414	Henningsen gravelly loam, wet
422	Henningsen Variant loam
431	Shalcar family peat
422	Holbrook gravelly fine sandy loam, 2 to 8 percent slopes
443	Holbrook very stony sandy loam, 4 to 15 percent slopes
444	Holbrook-Glenbrook association*
445	Holbrook-Greenbrae-Reno association*
446	Holbrook-Verdico association*
451	Hyloc-Ister association*
461	Hussman silty clay loam
462	Hussman clay loam, strongly saline-alkali
463	Hussman clay
471	Incy fine sand, 4 to 30 percent slopes
481	Indian Creek sandy loam, 0 to 4 percent slopes
482	Indian Creek gravelly fine sandy loam, 4 to 15 percent slopes
483	Indian Creek very cobbly loam, 2 to 8 percent slopes
485	Indian Creek-Haybourne association*
486	Indian Creek-Reno-Cassiro association*
487	Indian Creek Variant-Cassiro-Puett association*
488	Indian Creek Variant-Roloc association*
491	Indiano stony fine sandy loam, 30 to 50 percent slopes
501	James Canyon loam, drained, 2 to 4 percent slopes
502	James Canyon loam, drained, 4 to 8 percent slopes
503	Kimmerling Variant peat, 2 to 8 percent slopes
511	James Canyon Variant loam, 2 to 4 percent slopes
512	James Canyon Variant loam, slightly saline, 4 to 8 percent slopes
521	Job loam
523	Job loam, wet
524	Job loam, clay substratum
531	Jubilee loam
532	Jubilee clay, slightly saline-alkali
533	Jubilee Variant peat
534	Jubilee-Dressler-Kimmerling complex
541	Softscrabble-Glean-Genoa association*
552	Kimmerling loam, wet
553	Kimmerling clay loam
555	Kimmerling clay loam, clay substratum
561	Koontz-Sutro complex, 15 to 30 percent slopes
562	Koontz-Sutro complex, 30 to 50 percent slopes
571	Kram-Puett Variant association*
581	Loomer association*
582	Loomer-Olac association*
583	Loomer-Zephan-Olac association*
591	Minneha-Drit-Glean association*
592	Minneha-Drit-Rock outcrop association*
601	Mottsville loamy coarse sand, 2 to 4 percent slopes
602	Mottsville gravelly loamy coarse sand, 4 to 15 percent slopes
603	Mottsville very bouldery loamy coarse sand, 2 to 15 percent slopes
604	Mottsville-Drit-Roloc association*
611	Nevador fine sandy loam, 0 to 2 percent slopes
612	Nevador fine sandy loam, 4 to 8 percent slopes
621	Niwot loam
622	Niwot clay loam, clay substratum
631	Olac-Ister-Rock outcrop association*
641	Ophir gravelly sandy loam, 0 to 2 percent slopes
642	Ophir gravelly sandy loam, 2 to 8 percent slopes
644	Ophir Variant peat, 2 to 4 percent slopes
651	Oppio-Nosrac association*
661	Ormsby loamy sand
662	Ormsby gravelly loamy coarse sand

SYMBOL	NAME
671	Pernty-Burnborough Variant-Chen association*
672	Pernty-Burnborough-Glean association*
673	Pernty-Burnborough-Rock outcrop association*
681	Phing sandy loam, 4 to 8 percent slopes
682	Phing cobbly sandy loam, 4 to 15 percent slopes
683	Phing gravelly loam, 0 to 4 percent slopes
685	Phing-Chalco-Uhaldi association*
691	Updike Variant loam
693	Updike Variant-Playas association*
702	Perazzo gravelly loam, 2 to 8 percent slopes
712	Prey gravelly loamy sand, 0 to 4 percent slopes
713	Prey stony sandy loam, 4 to 15 percent slopes
721	Prey Variant stony loam, 2 to 15 percent slopes
731	Job Variant silty loam
741	Puett-Chalco association*
742	Puett-Chalco-Pula complex, 30 to 50 percent slopes
743	Puett-Verdico-Haybourne association*
744	Puett-Verdico-Uhaldi association*
751	Pula-Cassiro association*
752	Pula-Chalco-Pung association*
753	Pula-Nosrac-Uhaldi association*
762	Pulcan-Puett-Uhaldi association*
771	Rawe gravelly sandy loam, 4 to 15 percent slopes
772	Rawe gravelly fine sandy loam, 2 to 4 percent slopes
781	Reno gravelly sandy loam, 2 to 8 percent slopes
782	Reno gravelly sandy loam, 8 to 15 percent slopes
783	Reno very cobbly loam, 2 to 8 percent slopes
784	Reno gravelly clay loam, 0 to 4 percent slopes
785	Phing Variant-Reno association*
786	Reno-Phing-Springmeyer association*
787	Reno-Saralegui association*
788	Reno-Stucky association*
789	Phing Variant-Zephan association*
791	Risue gravelly loam, 0 to 8 percent slopes*
792	Risue very gravelly loam, 8 to 15 percent slopes
801	Riverwash
811	Rock outcrop
821	Roloc-Drit association*
831	Saralegui sand, 0 to 2 percent slopes
832	Saralegui sand, 2 to 8 percent slopes
833	Saralegui association*
834	Saralegui-Haybourne-Reno association*
841	Searles-Devada-Duco association*
842	Searles-Burnborough-Duco association*
843	Searles-Burnborough-Chen association*
851	Settlemeyer clay loam
852	Settlemeyer clay loam, drained
854	Settlemeyer loam, drained
861	Shakespeare gravelly loam, 8 to 30 percent slopes
871	Shree very gravelly loam, 2 to 8 percent slopes
872	Shree very stony loam, 4 to 15 percent slopes
873	Shree-Settlemeyer association*
874	Shree-Pung association*
881	Springmeyer gravelly fine sandy loam, 4 to 15 percent slopes
882	Springmeyer stony fine sandy loam, 15 to 50 percent slopes
883	Springmeyer very stony fine sandy loam, 30 to 50 percent slopes
884	Springmeyer gravelly loam, 2 to 8 percent slopes
891	Stodick very stony fine sandy loam, 15 to 30 percent slopes
892	Stodick-Indiano association*
901	Surgem-Olac-Cagle association*
911	Theon very gravelly loam, 8 to 15 percent slopes
912	Theon very gravelly loam, 15 to 50 percent slopes
921	Nevador Variant fine sandy loam, 0 to 4 percent slopes*
922	Nevador Variant loam, 4 to 15 percent slopes*
923	Nevador Variant very gravelly loam, 4 to 8 percent slopes

SYMBOL	NAME
931	Temo-Rock outcrop complex, 30 to 50 percent slopes
932	Temo-Rock outcrop complex, 50 to 70 percent slopes
941	Toiyabe-Rock outcrop complex, 30 to 50 percent slopes
942	Toiyabe-Rock outcrop complex, 50 to 75 percent slopes
951	Toll sand, 0 to 4 percent slopes
952	Toll sand, 4 to 15 percent slopes
953	Toll sand, clay substratum, 0 to 2 percent slopes
961	Burnborough-Glean association*
962	Burnborough-Pernty-Glean association*
963	Burnborough-Sup-Chen association*
972	Trid-Drit association*
973	Trid-Drit-Duco association*
974	Trid-Roloc-Drit association*
975	Trid-Roloc-Glean association*
976	Trid-Roloc-Mottsville association*
977	Trid-Roloc-Sup association*
982	Turria loam
985	Turria clay loam, wet
986	Turria silty clay loam
992	Updike silty clay loam, moderately saline-alkali
993	Updike-Springmeyer association*
994	Updike silty clay loam, strongly saline-alkali
1011	Verdico-Puett association*
1012	Verdico-Uhaldi-Springmeyer association*
1021	Veta very gravelly sandy loam, rarely flooded, 2 to 4 percent slopes
1031	Vicee-Rock outcrop complex, 50 to 75 percent slopes
1041	Voltaire silty clay loam, wet, strongly saline-alkali
1042	Voltaire silty clay
1044	Voltaire clay, slightly saline-alkali
1051	Voltaire Variant clay loam
1061	Washoe gravelly sandy loam, 0 to 2 percent slopes
1062	Washoe very gravelly sandy loam, 2 to 8 percent slopes
1063	Washoe cobbly sandy loam, 0 to 2 percent slopes
1066	Washoe-Reno association*
1071	Corbett gravelly sand, 15 to 30 percent slopes
1072	Corbett-Toiyabe complex, 30 to 50 percent slopes
1073	Corbett-Toiyabe association*
1081	Zephan association*
1091	Uhaldi-Nosrac association*
1101	Pung-Phing-Chalco association*
1102	Pung-Pula-Uhaldi association*
1111	Stucky extremely cobbly sandy loam, 8 to 15 percent slopes
1112	Stucky association*

* Broadly defined

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL; LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS
- Interstate (79)
- Federal (410)
- State (52)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or small (water; w)

PITS
- Gravel pit (G.P.)
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot (less than 5 acres)

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (SvE; 107)

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) (S)

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Cobbly surface (up to 5 acres)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(GENOA QUADRANGLE)

SCALE 1:24 000
1/2 MILES
1 KILOMETERS

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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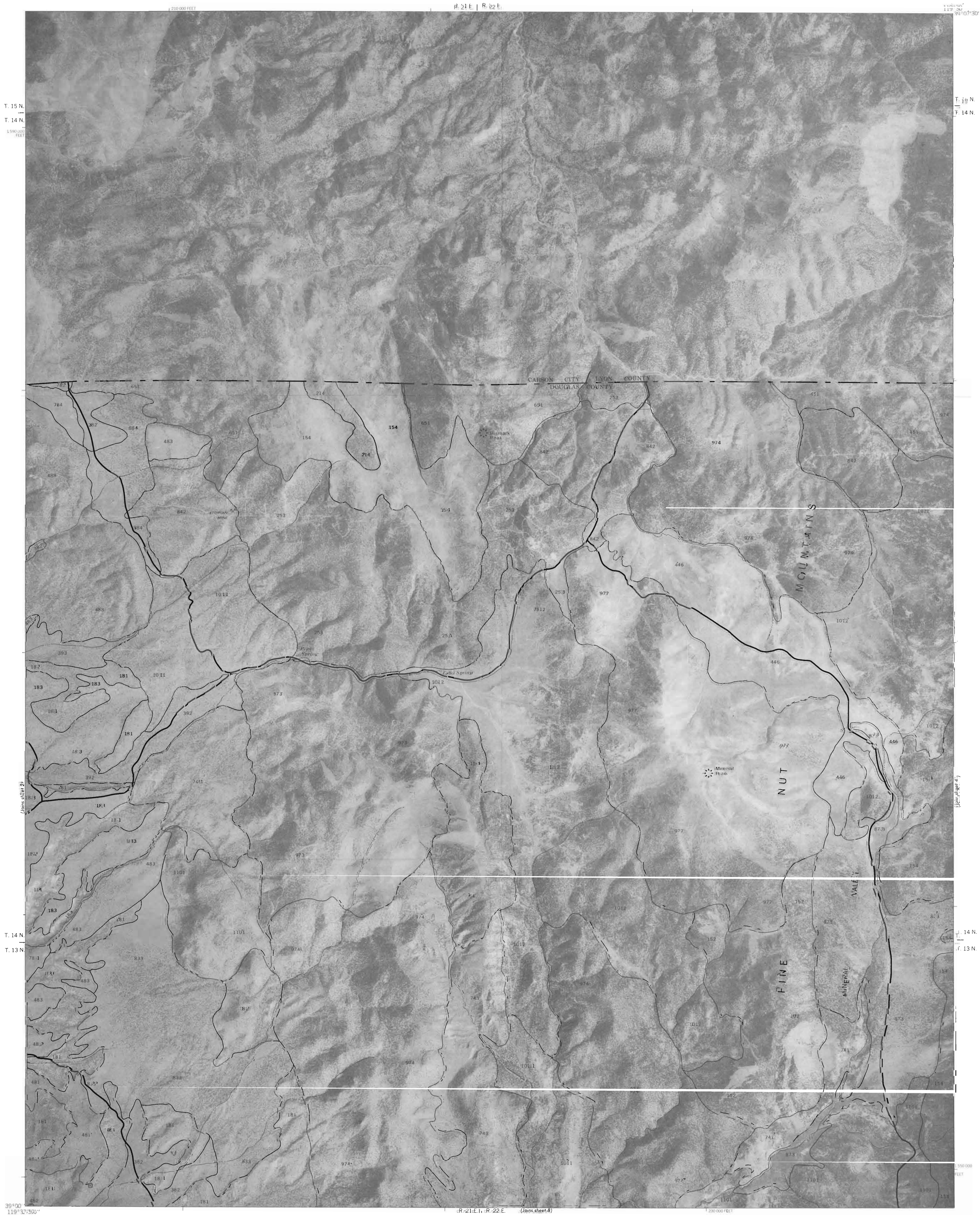
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 3
SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(DAYTON SE QUADRANGLE)



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SCALE 1:24 000

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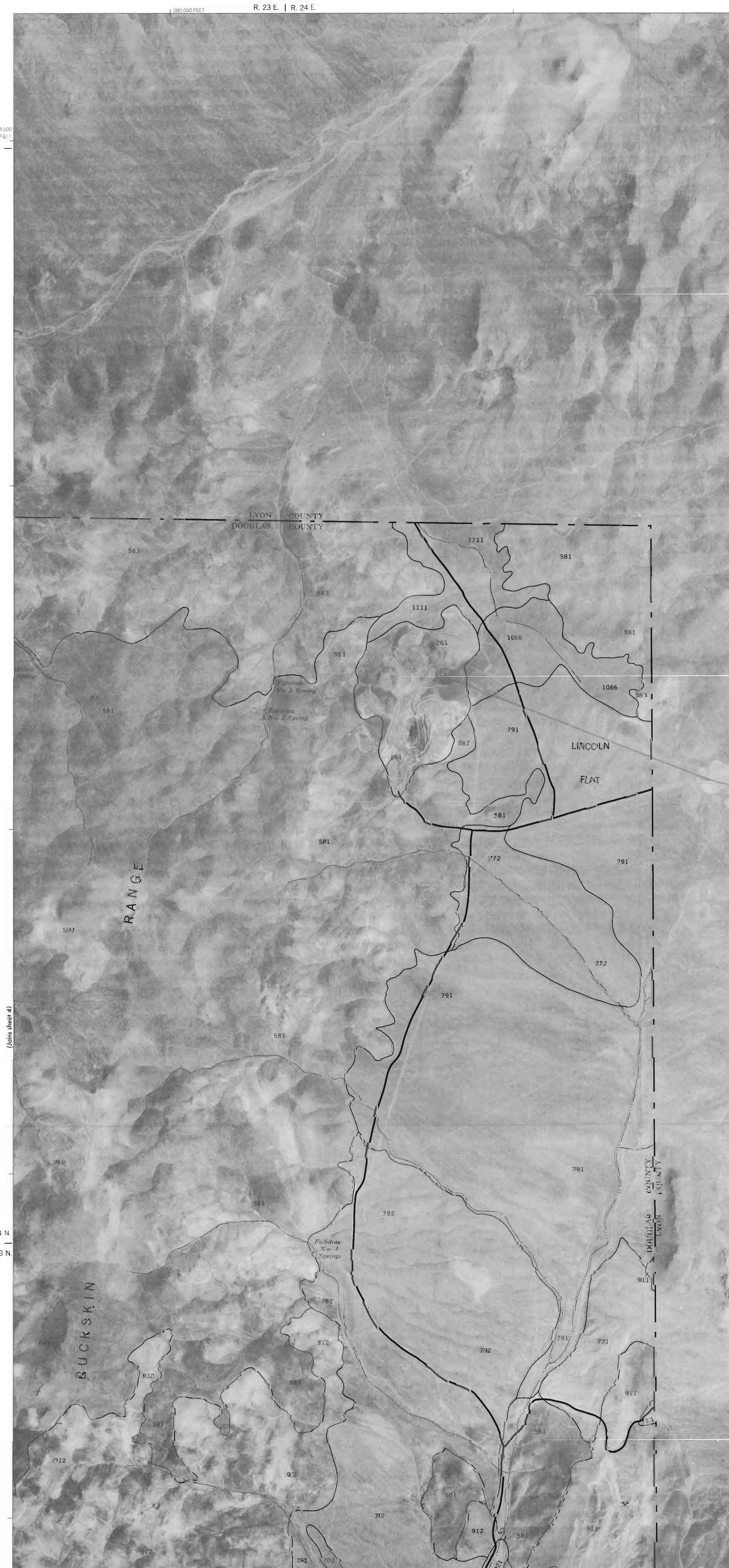
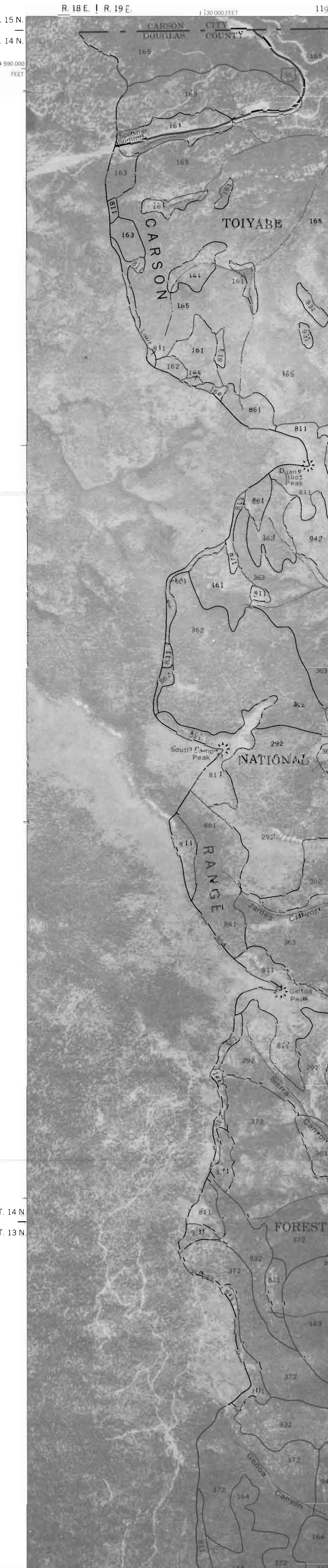
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000





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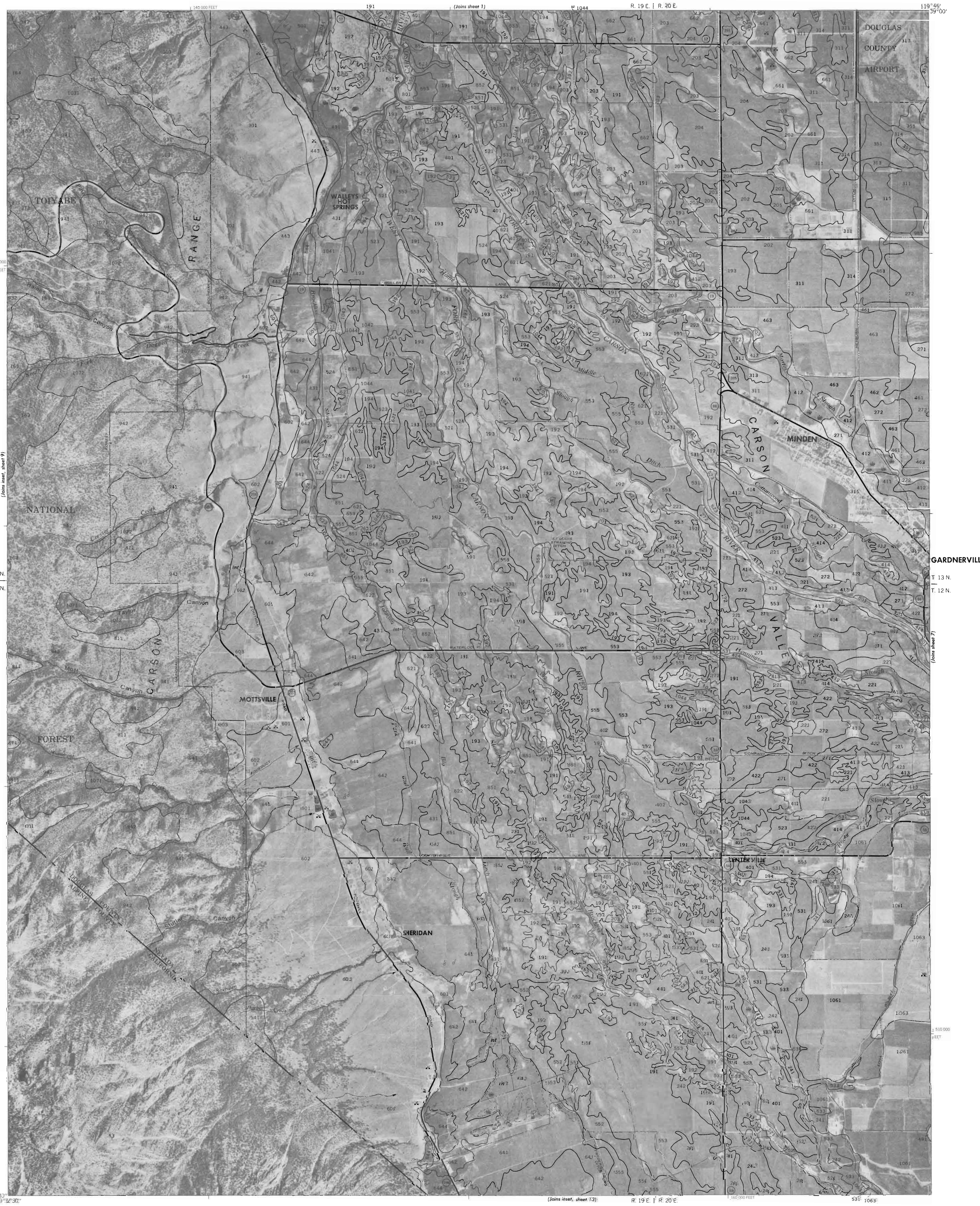
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(MINDEN QUADRANGLE)



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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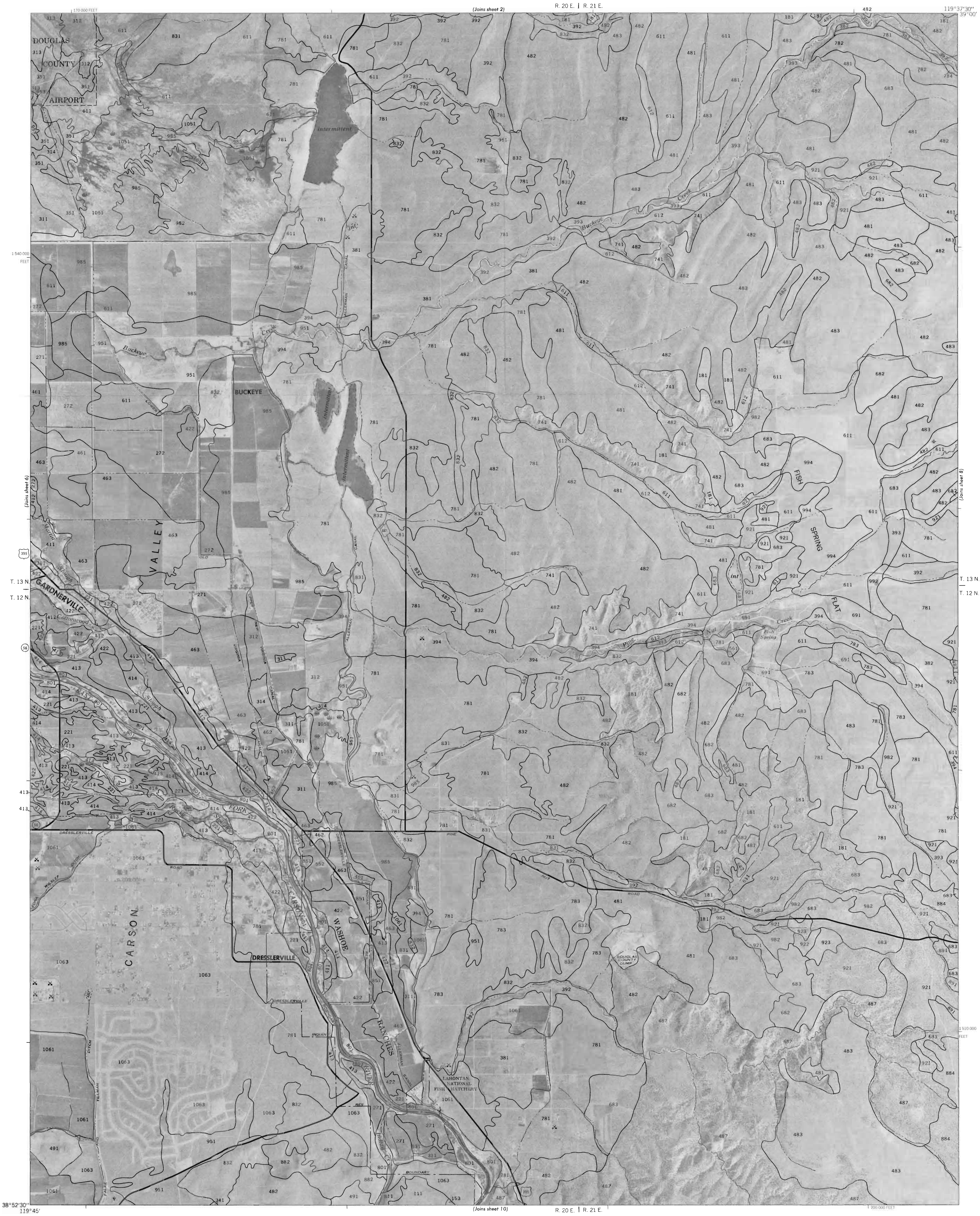

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

R. 21 E. | R. 22 E. (Joins sheet 3)

38°52'30"
119°37'30"

R. 21 E. | R. 22 E. (Joins sheet 11)

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SCALE 1:24 000

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(WELLINGTON NW AND SOUTH LAKE TAHOE QUADRANGLES)

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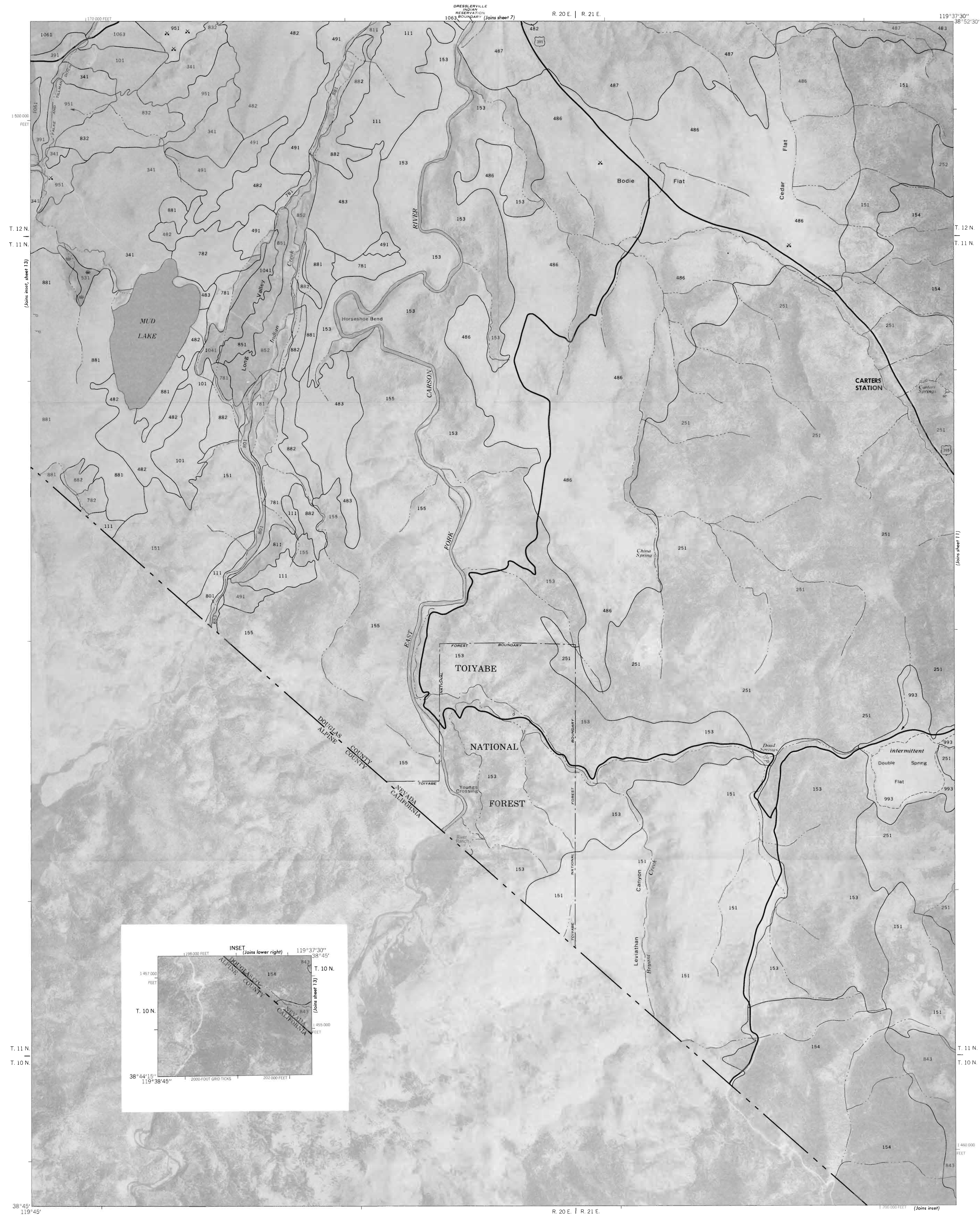
SOIL CONSERVATION SERVICE

SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(CARTERS STATION AND TOPAZ LAKE NW QUADRANGLES)



SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(MT SIEGEL SE QUADRANGLE)

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

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SOIL CONSERVATION SERVICE

SHEET NO. 13
SOIL SURVEY OF DOUGLAS COUNTY AREA, NEVADA
(TOPAZ LAKE NE AND WOODFORDS QUADRANGLES)

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 2 KILOMETERS
SCALE 1:24 000

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1 — 3/4 — 1/2 — 1/4 — 0 — 1 MILE

1 — 0.5 — 0 — 1 — 2 KILOMETERS

SCALE 1:24 000

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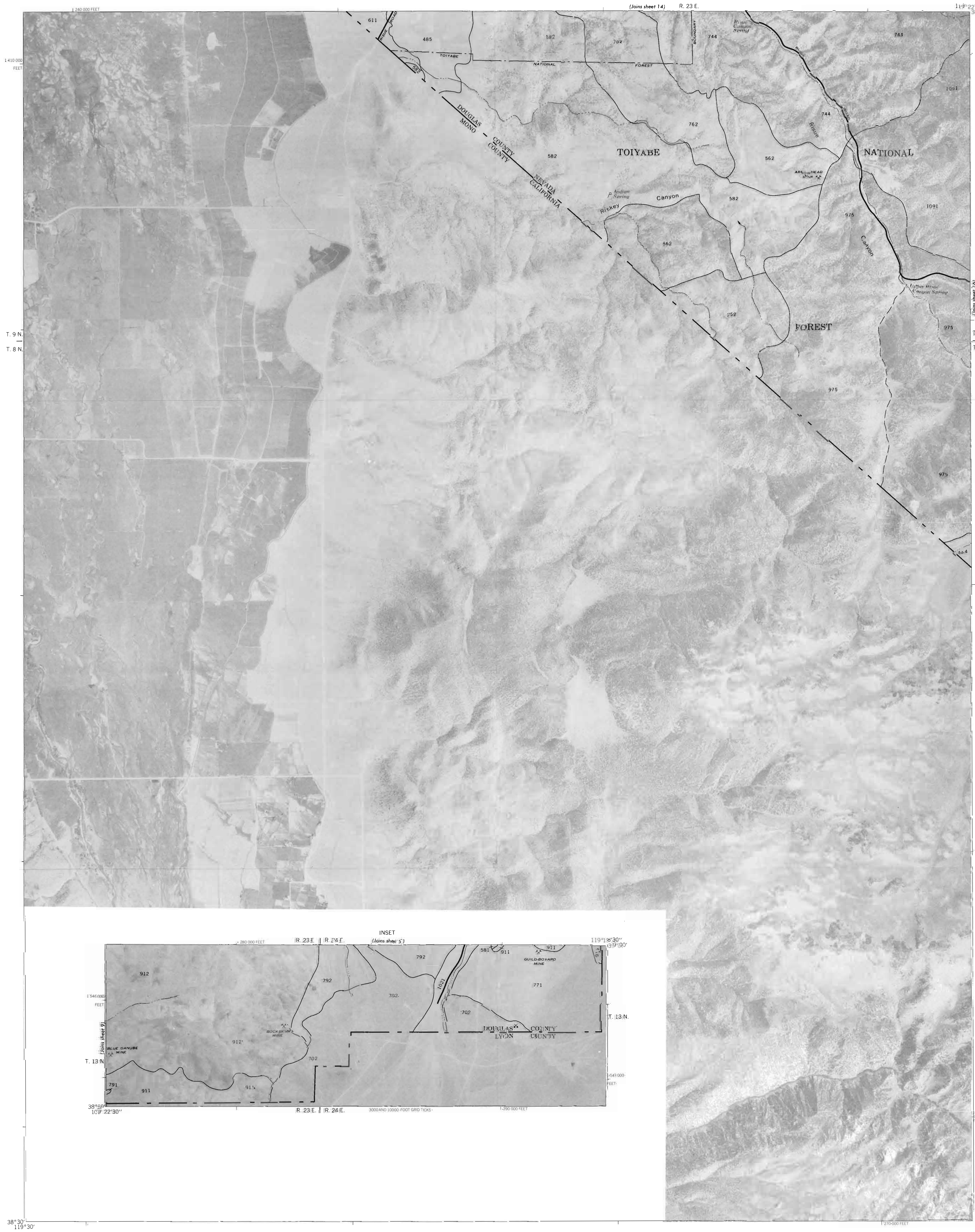

SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

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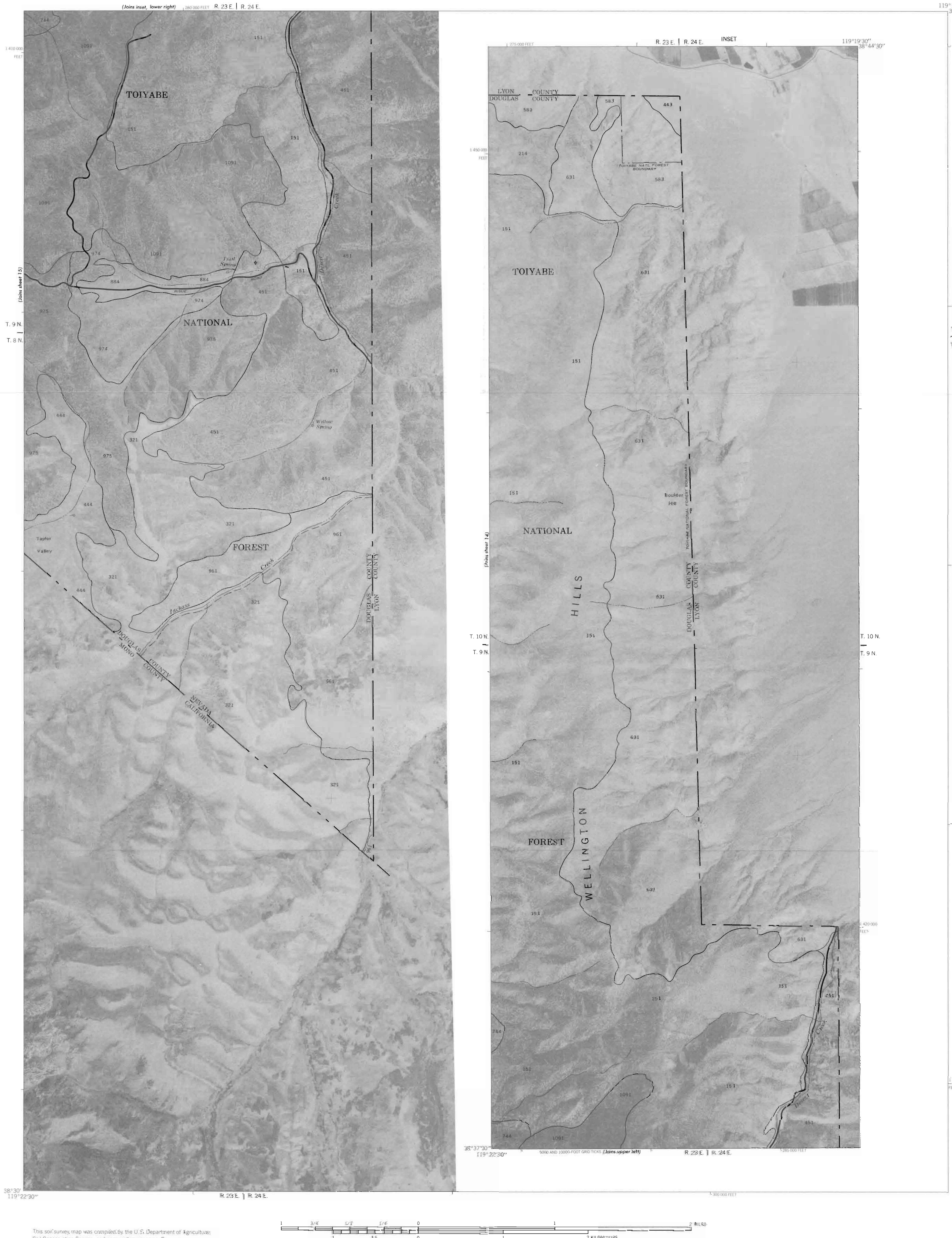

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